

HOTEL DESIGN

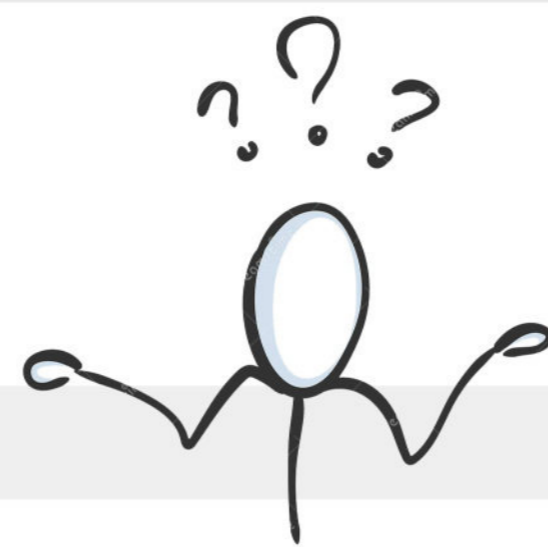
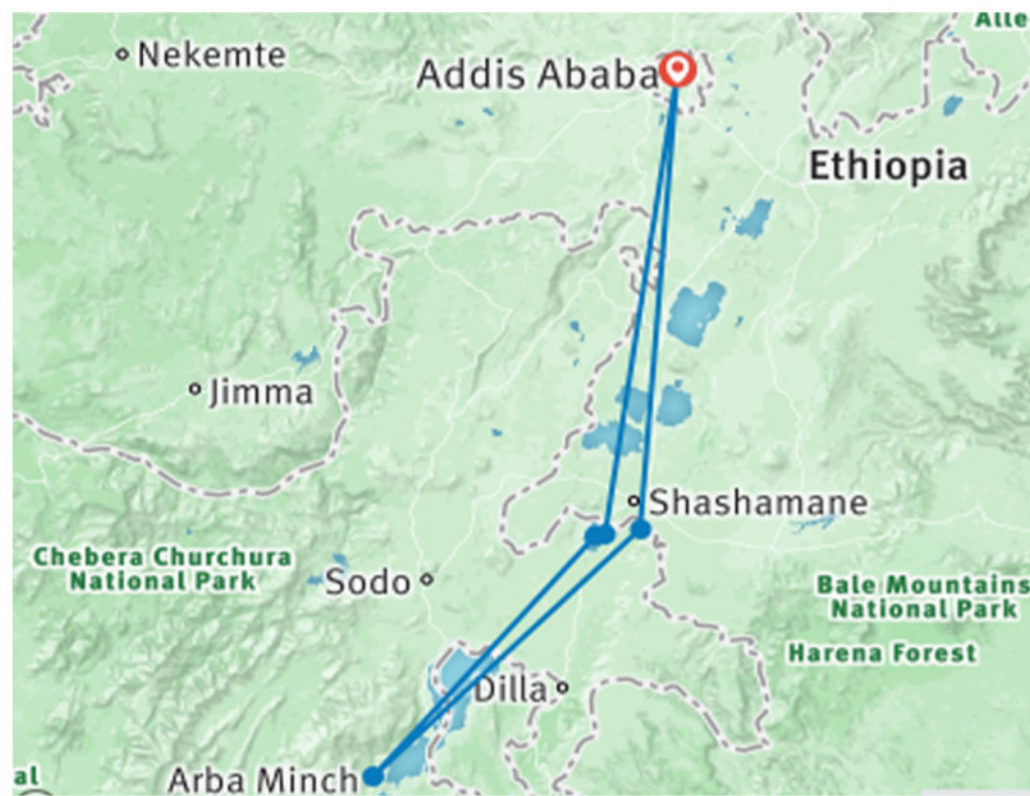
ENERGY EFFICIENCY



JUSTIFICATION

ARBA MINCH CITY

505 Km - Addis Ababa 275 Km - Hawassa
Abaya - North and north east Chamo - south



- 1 Finding
- 2 Nomination of the project
- 3 Why tourism?
- 4 what do they need?
- 5 Objective
- 6 targeted user group
- 7 Benefits of the project

OBJECTIVE

- Lower the amount of energy used for heating and cooling in all seasons
- Reduce the amount of energy used for the lighting by allowing right amount natural light in without affecting Thermal comfort.
- Offering high-quality hotel design that adheres to International hotel design guidelines and standards.
- Providing a water recycling system and solar panels as Part of an energy-zero Design project.

TARGETED USERS

- Domestic (walk in customer) and foreign tourists

BENEFITS OF THE PROJECT

The main benefits of hotel tourism are income creation And generation of jobs.

Energy efficient design benefits

- Economical benefit
- Cost savings - lower energy, water, and maintenance Costs.
- Environmental benefit

Lower emissions and overall environmental impact: Energy efficient buildings have lower greenhouse gas Emissions due to their reduced reliance on fossil fuels

FINDING



Lake Chamo and Abaya



Colorful tradtiona clothes



crocodile ranch



Local fruit and vegetable



40 Spring water



Nech Sar National Park

NOMINATION OF THE PROJECT

The primary goal of the project selection process is to allocate architectural solutions that are directly Linked to the attainment of arbaminch economic Sustainability.

- 1 Grocery shopping - for the production of vagitabe
- 2 lakeside apartments - for Local residence
- 3 Hotel - As a promoter of tourism industry
- 4 Cultural center to promotes culture and arts for tangible And intangible cultural heritage.

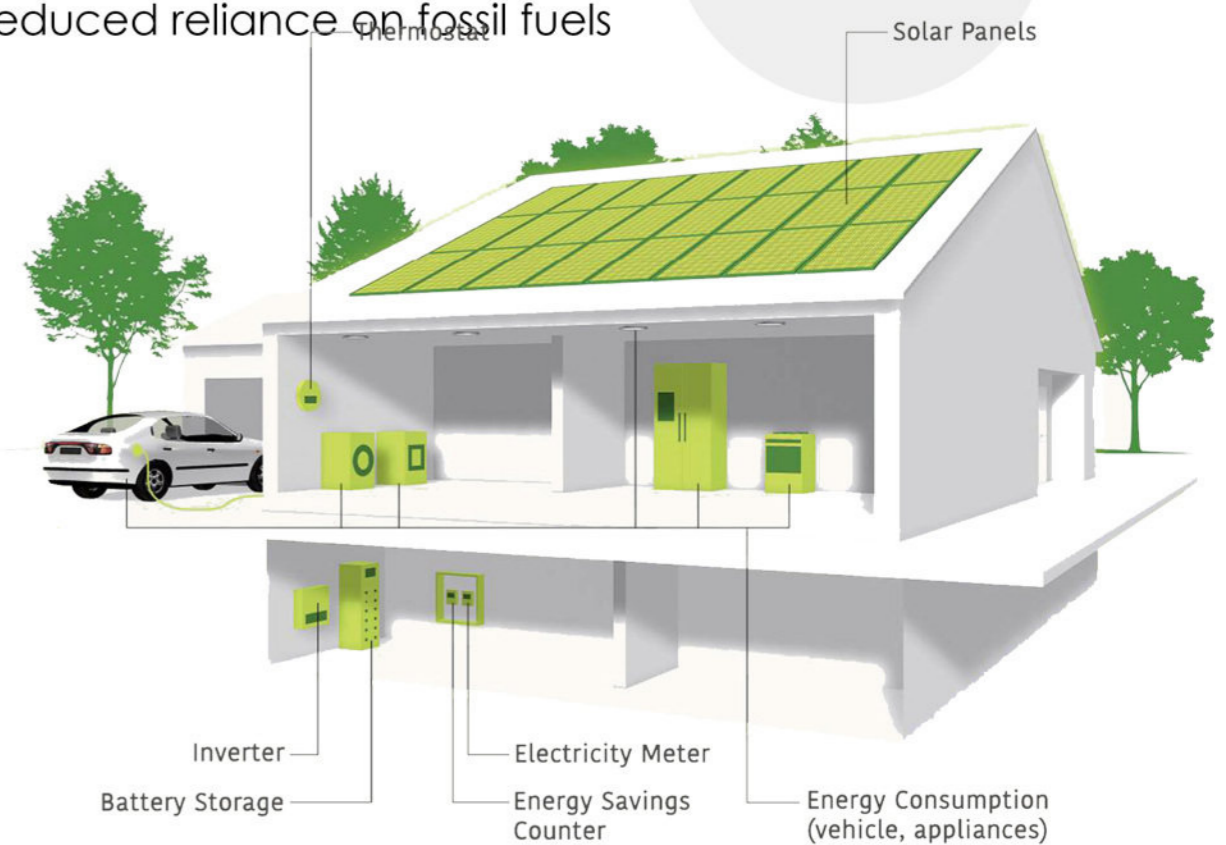
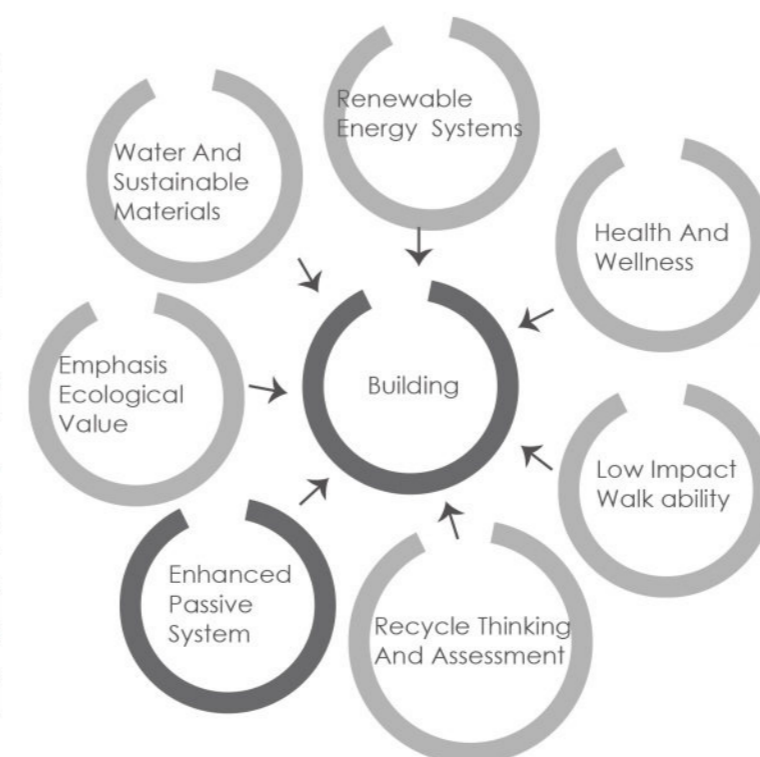
WHY TOURISM?

- Potentials
- Park tourism
 - Ecotourism
 - Agro-biodiversity
 - Paleontology tourism
 - Water tourism
- Experience & see natural wonders of places, cultures.

WHAT DO THEY NEED?

It simply refers to the necessities that must be provided During a trip, such as food, lodging, destination services, Transportation, and costs incurred - Lodging + Food = hospitality service like Hotel.

ENERGY EFFICIENCY



Efficient energy use, sometimes simply called energy efficiency, is the Goal to reduce the amount of energy required to provide products And services and can also reduce effects of air pollution. Buildings Have a huge potential for energy efficiency. To obtain this large Potential there is a need to take some regulations and initiatives to Improve the efficiency in buildings. Energy consumption in buildings Occurs in every phase of building life cycle. However, the important Phase is the usage and maintenance process of buildings where Energy is consumed most within the scope of life cycle.

During the building life cycle, the highest energy consumption occurs During the usage stage. This is because this period is much longer in Duration compared to the other stages and the comfort levels Necessary for human health and working efficiency need to be Provided at this stage.

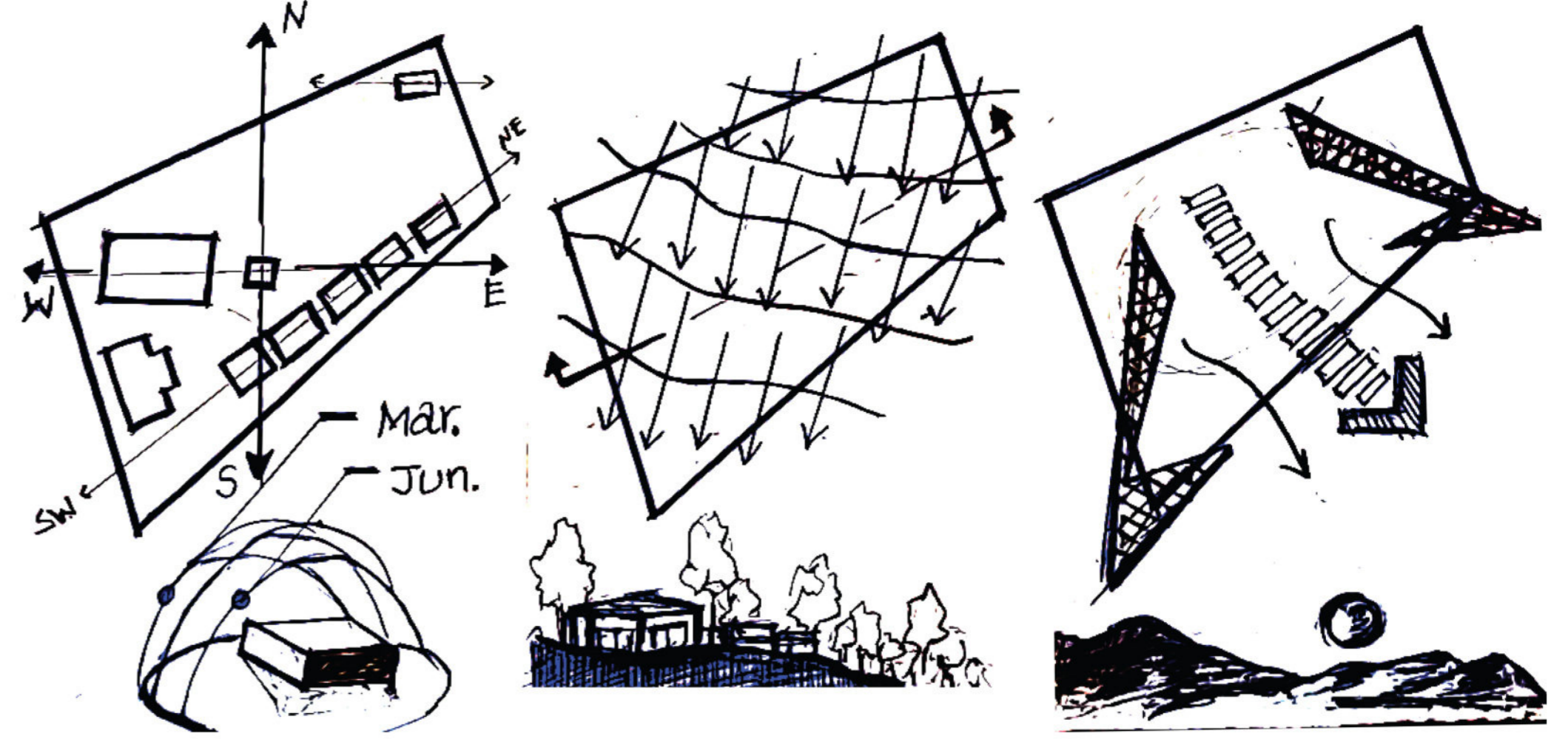
SITE LOCATION



SUN SHADE

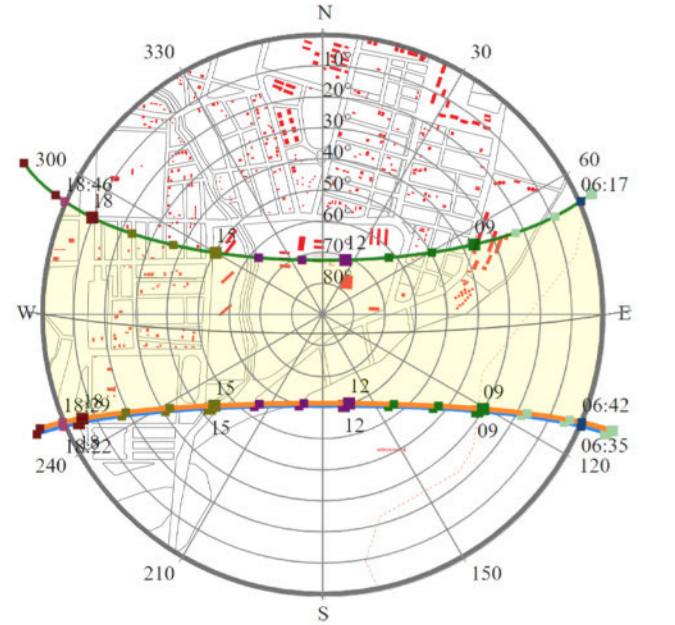
DRAINAGE PATTERN

VIEW



BACKGROUND STUDY

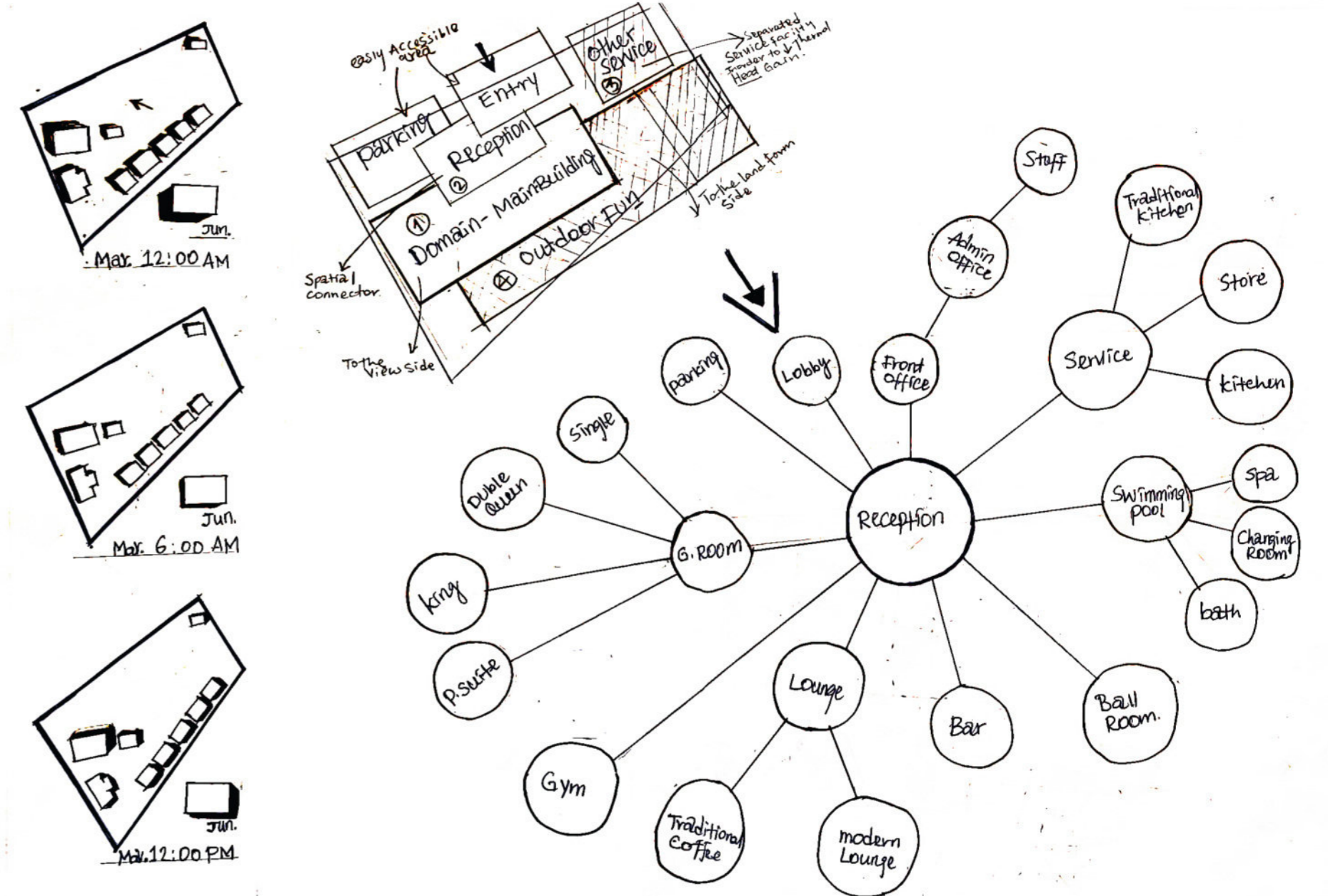
Arba Minch is the second largest city in south Ethiopia and the capital of the Gamo Gofa zone. It is located 505 kilometres south of AddisAbaba, 270 kilometres south of Hawassa, and 110 kilometres south of Wolayta Sodo. Geographically, the city is situated at 6005' North latitude and 37038' East longitude, with a mean sea level of 1300m - 1500m. It has a total size of 5556.6 hectares. Following the three primary sections of the city, the settlement in the city had three significant features: Shecha, Sikela, and Limat. Our location is 4 kilometres from the city administration headquarters, which is cated in Sikela. The location is located in the chamo kebele of Shecha sub-city.



The town is found in a great rift Vally. The average temperature is 240 c, accordingly the town classified under the a hot climate city. In the world their are cities like Dubai with max temperature reaches 400c in July and in Moscow -100c during cold season.

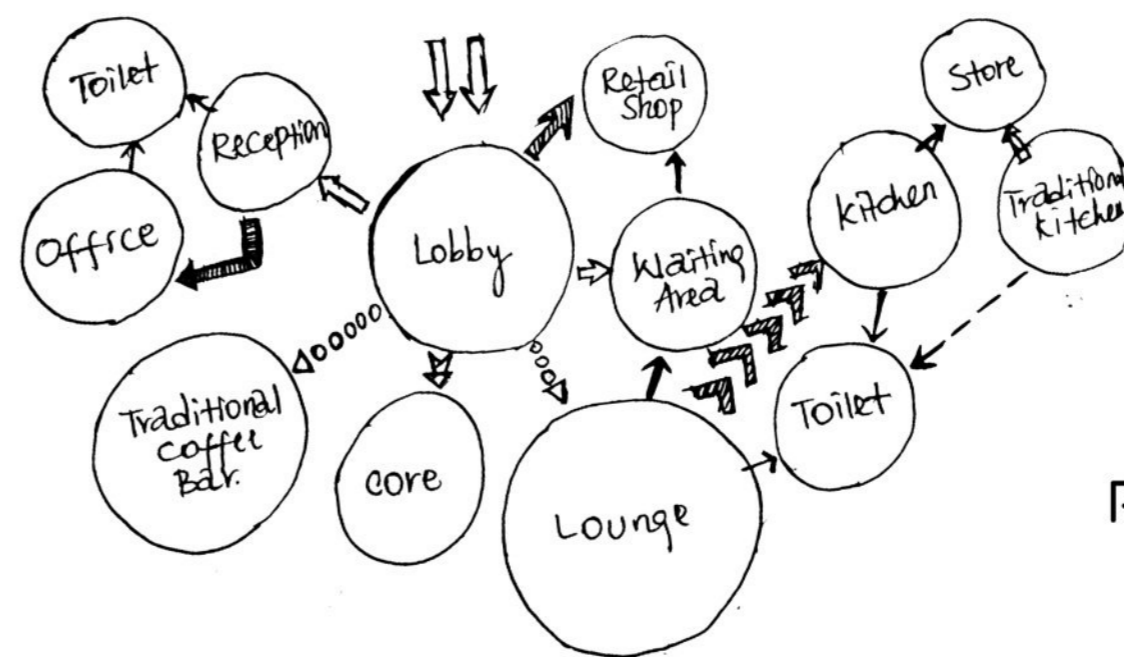
ZONING AND BUBBLE DIAGRAM

ANNUAL SUN SHAD ANALYSIS

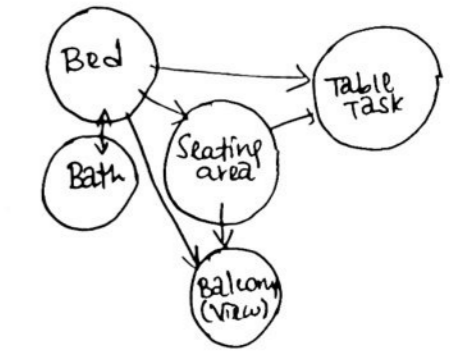


BUBBLE-DIAGRAMS

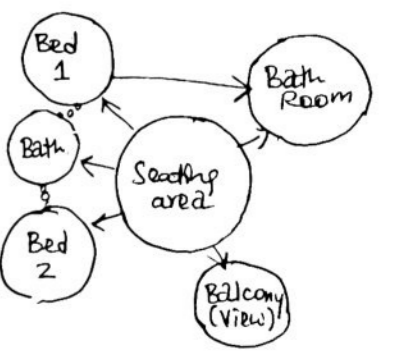
MAIN LOBBY



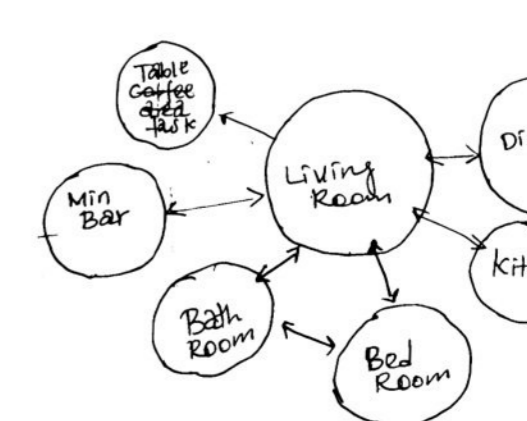
KING SIZE



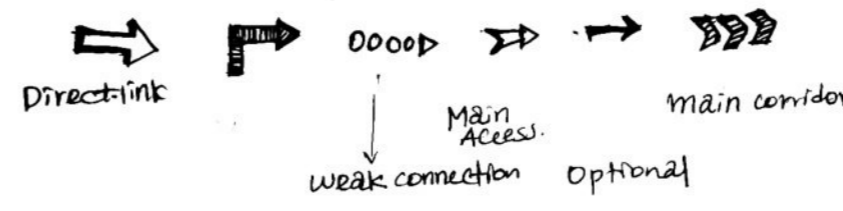
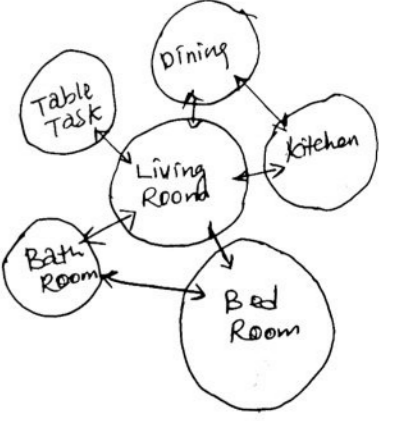
QUEEN SIZE



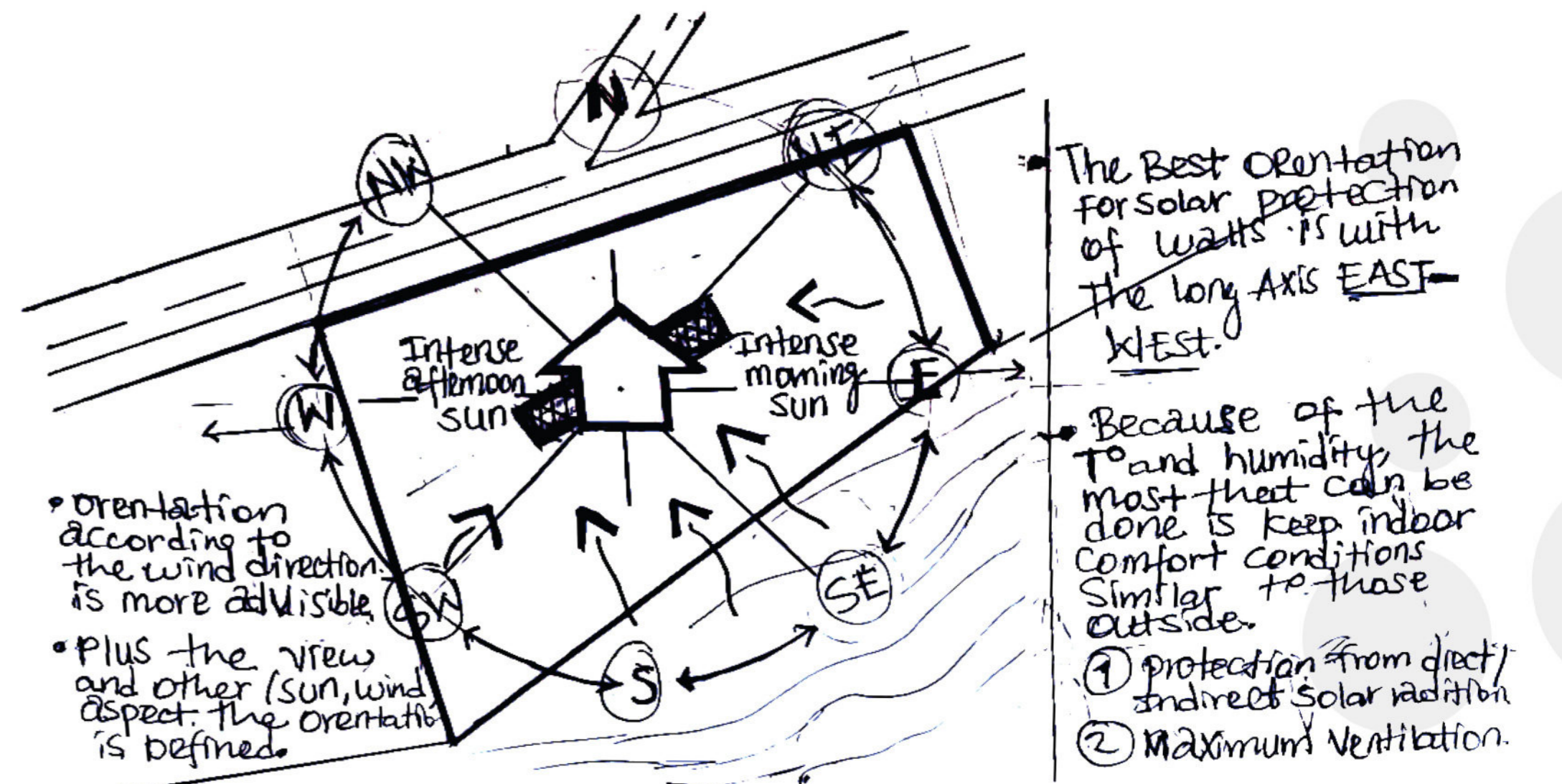
PRESIDENTIAL SUIT



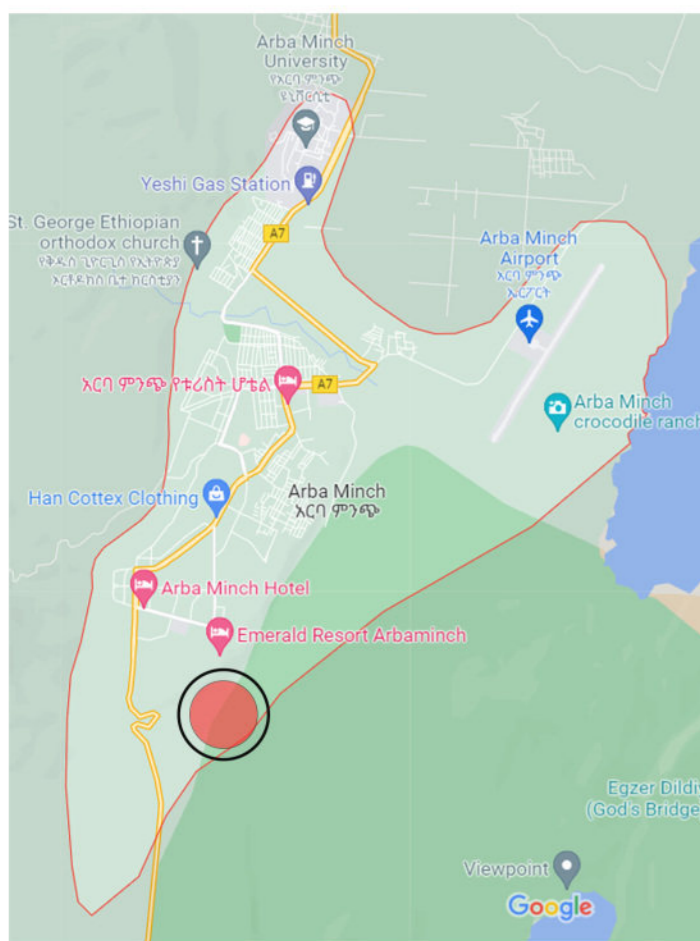
ONE SUIT



ORIENTATION



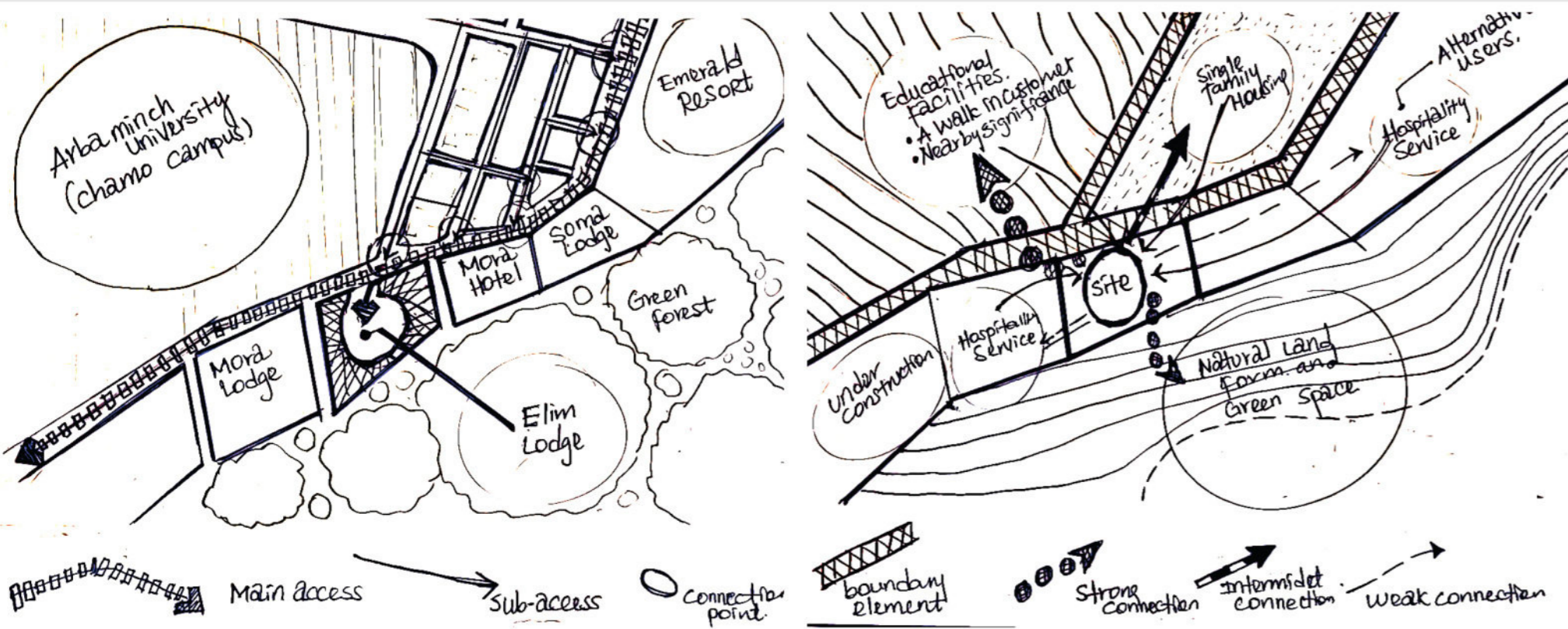
LOCAL NAME-"KEYAFER"



FINDING



NEIGHBORHOOD ANALYSIS



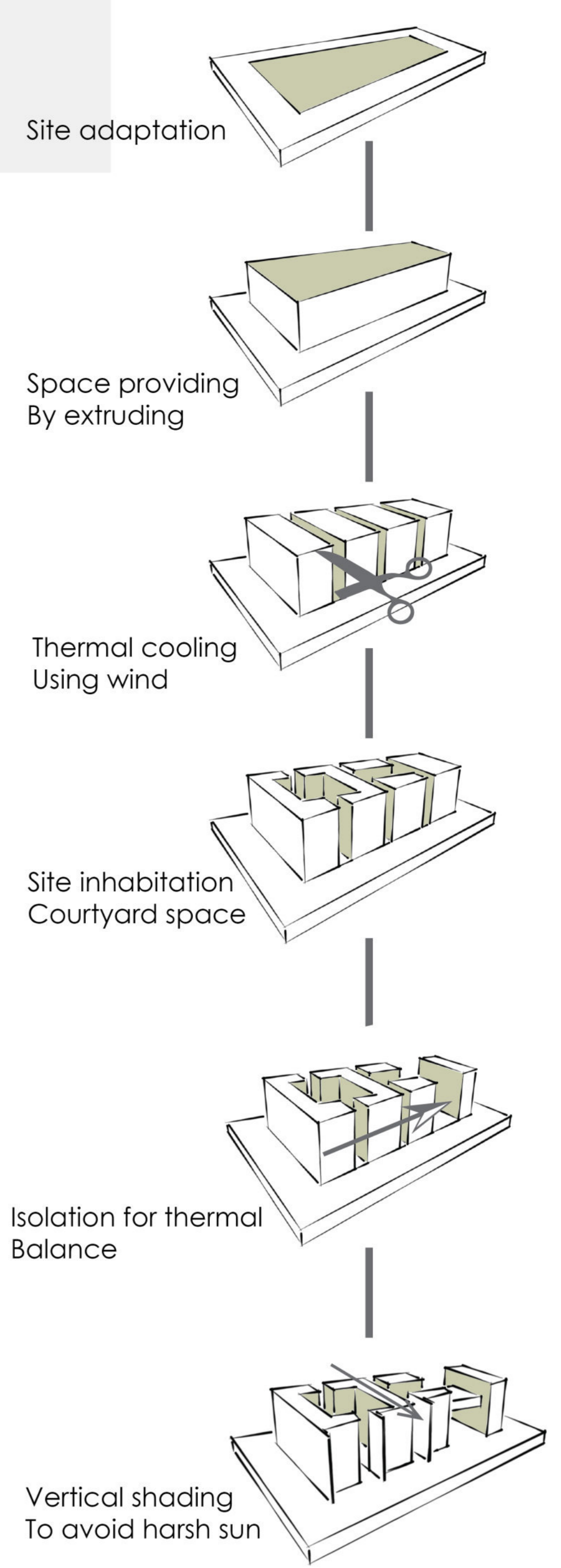
CONCEPT DEVELOPMENT



INSPIRATION

The formal composition is heavily influenced by the landscape's character as well as the climate zone of the site's location. The primary goal was to achieve the highest level of thermal comfort and design for improved visual quality. The major objective provided is to create a more energy efficient design based on this goal. My idea for this proposal comes from nature itself, which I believe may be improved by integrating into the construction as an integral aspect of the building. The outdoor community area, on the other hand, is designed to improve communication with the surrounding environment, such as the rocky mountain, the lakeside, and the natural forest. The building receives ample ventilation by cross ventilation as a result of the rising breeze from the bottom side of the cliff, and it also receives a struck effect because to the atrium. The walls extended purposefully to act as a shade martial and wind breeze mechanism, as seen on the idea diagram.

CONCEPTUAL DIAGRAM



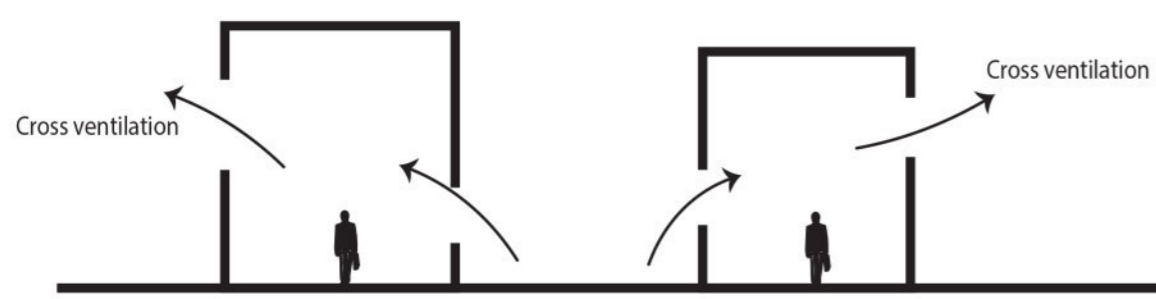
PASSIVE VENTILATION SYSTEM

ENERGY EFFICIENCY STRATEGY

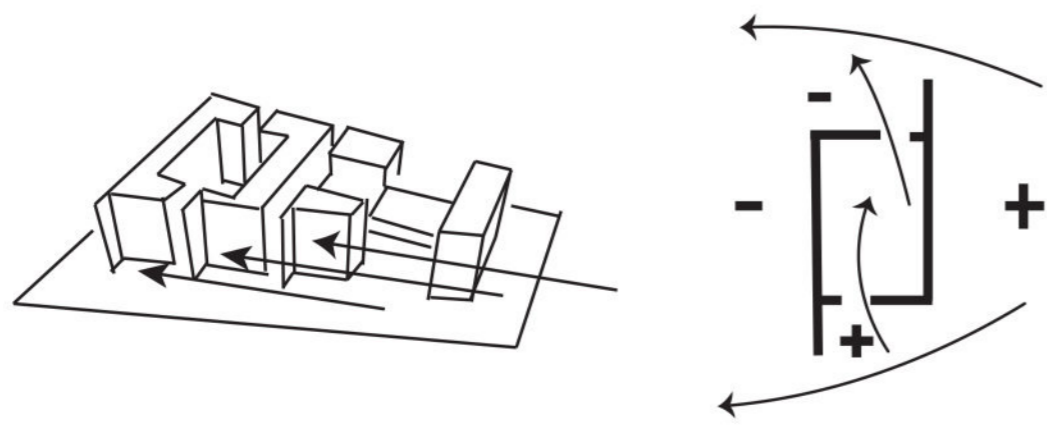


Ventilative cooling: Warm building air and replacing it with cooler outside air. Directing moving air across Occupants' skin to cool by combination of convection and evaporation.

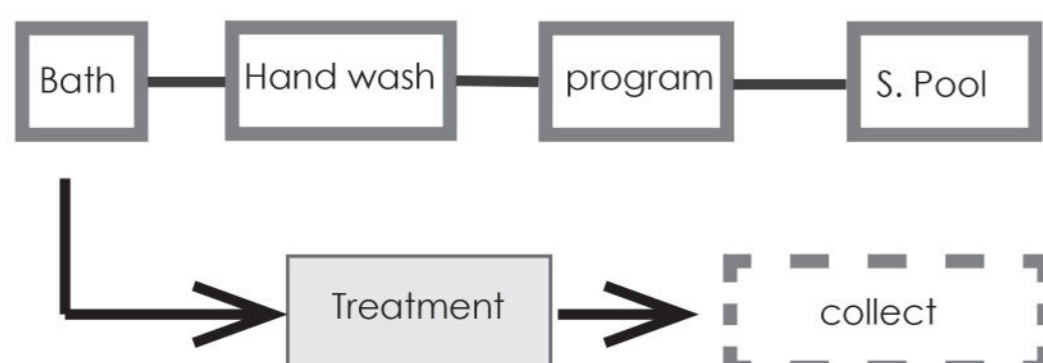
WIND VENTILATION



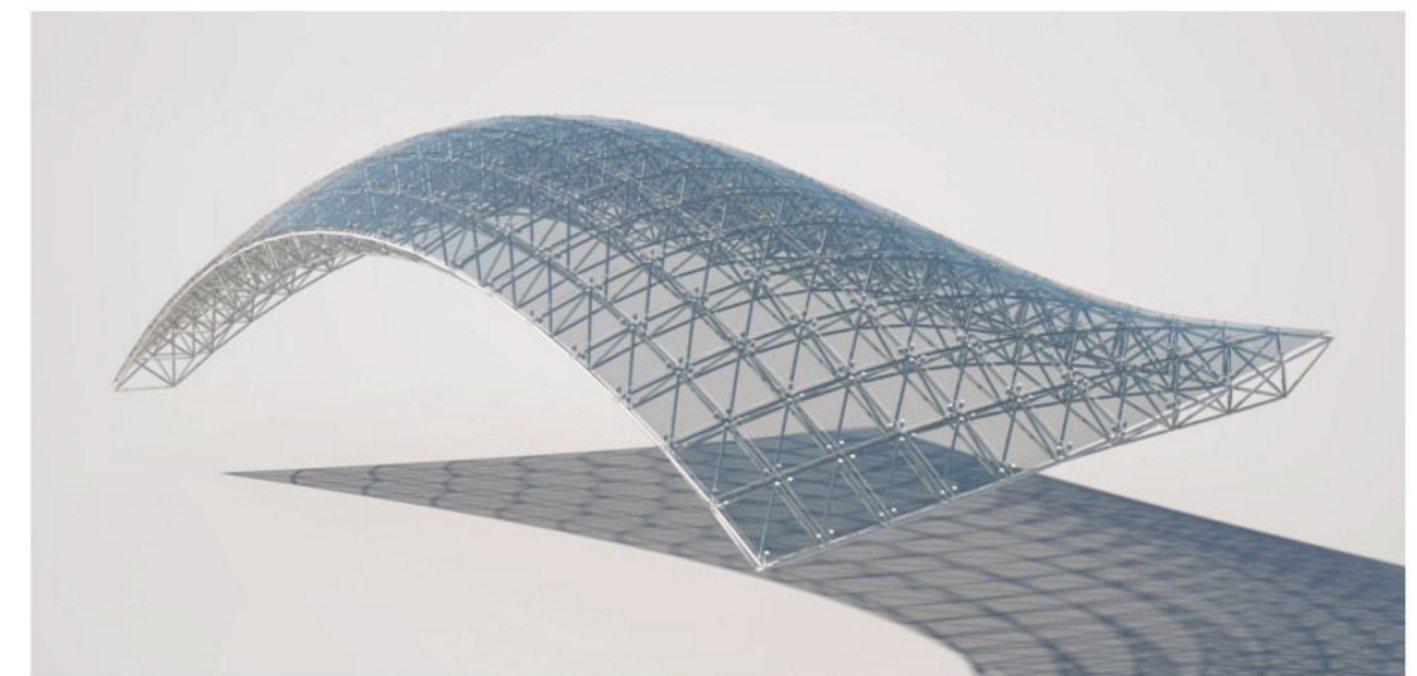
Extending a wall to capture some breeze



WATER TREATMENT



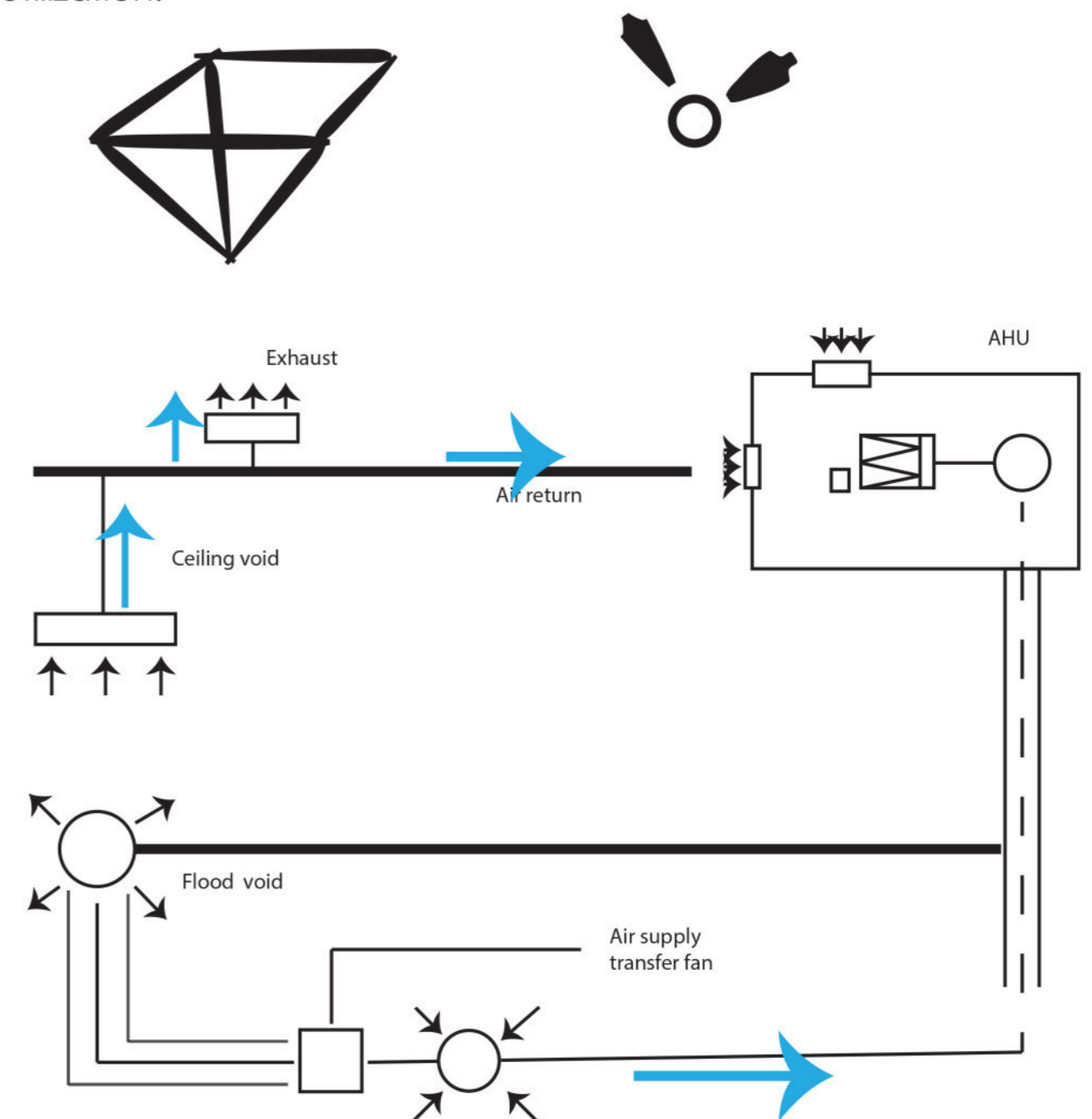
PARAMETRIC DESIGN



Parametric Roof

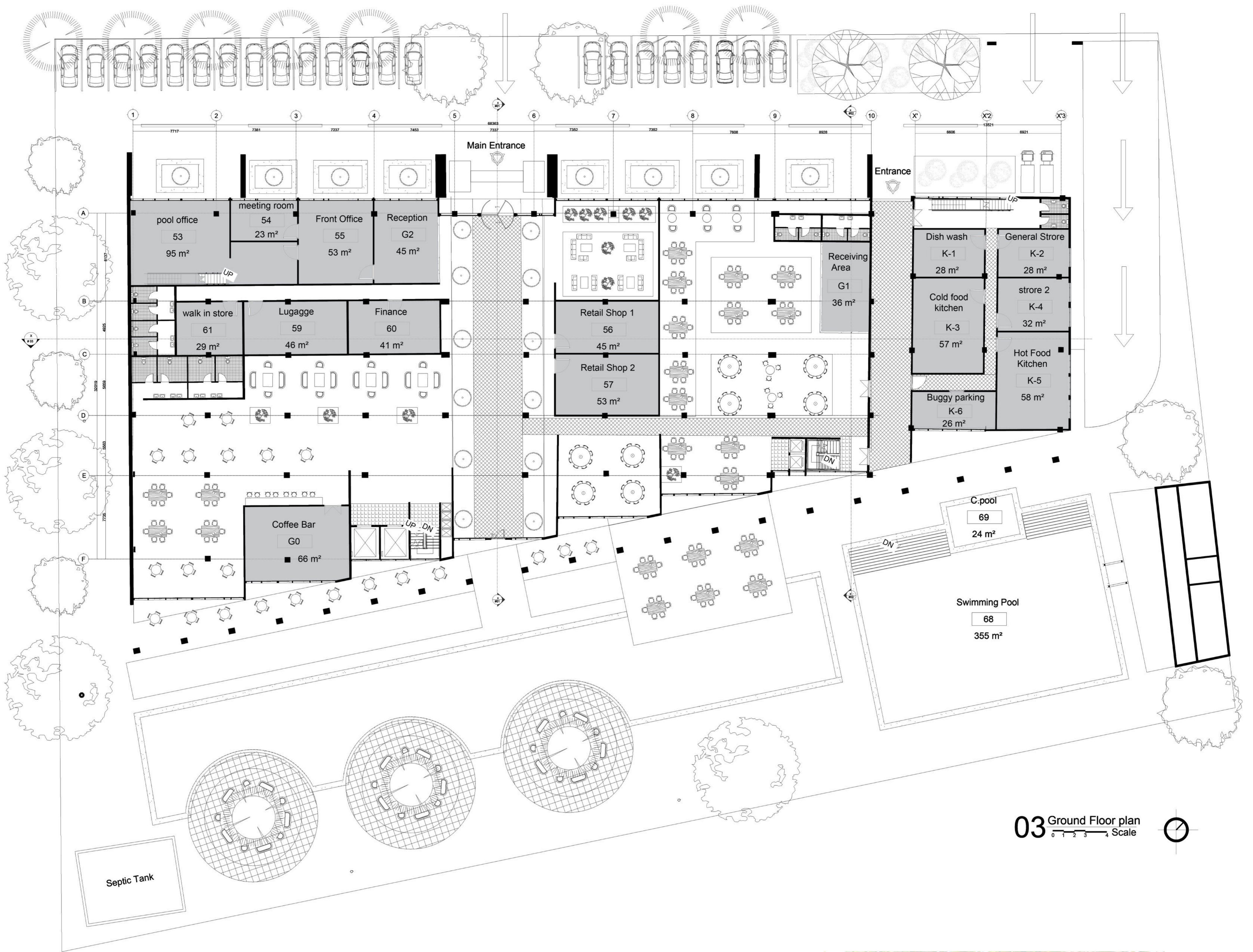
On all surfaces, more design control and the opportunity to Create conceptual integrity. For all design parameters, more Precise outcomes. Lower expenses, less material waste, less Wasteful product transportation, and more productive labor Utilization.

HYBRID VENTILATION SYSTEM



Except for the underground sections, practically all of the Rooms in the design have access to natural ventilation.

FLOOR PLANS



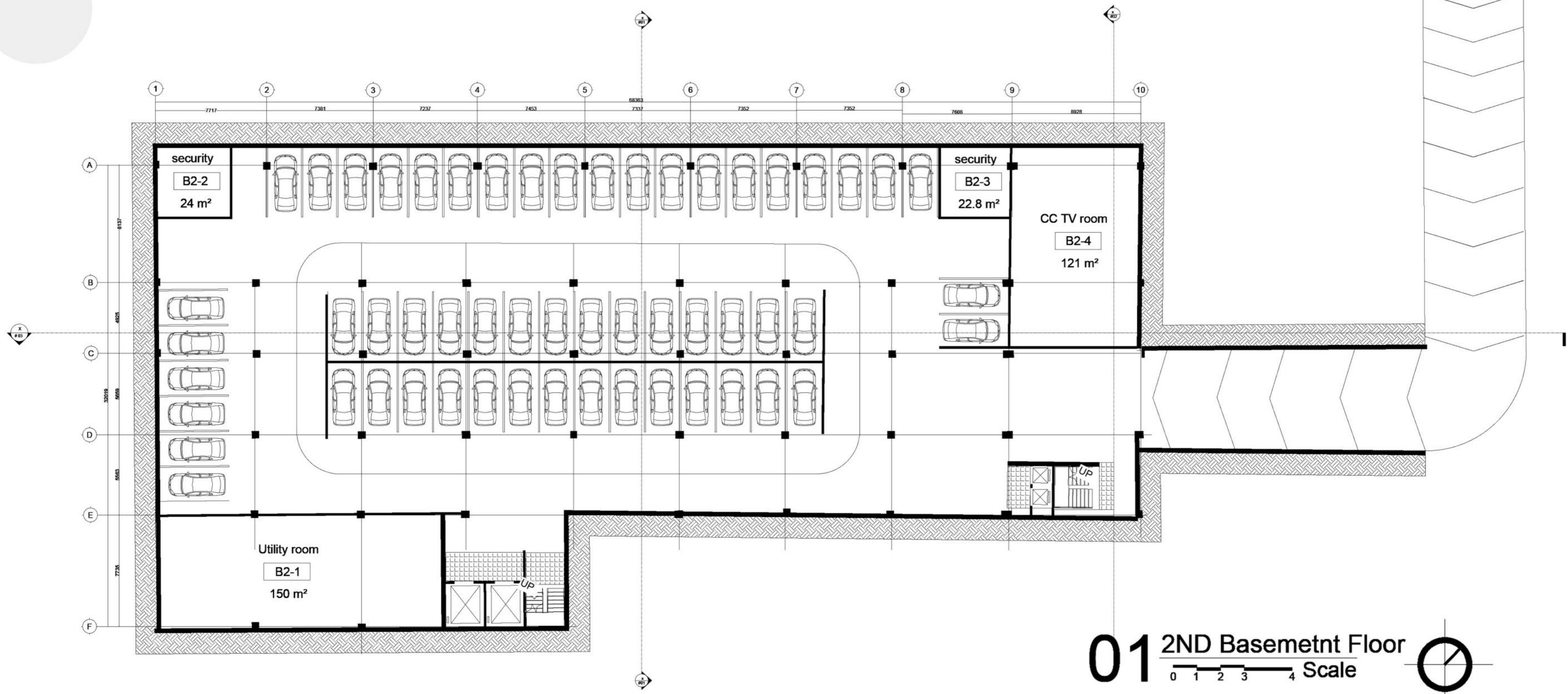
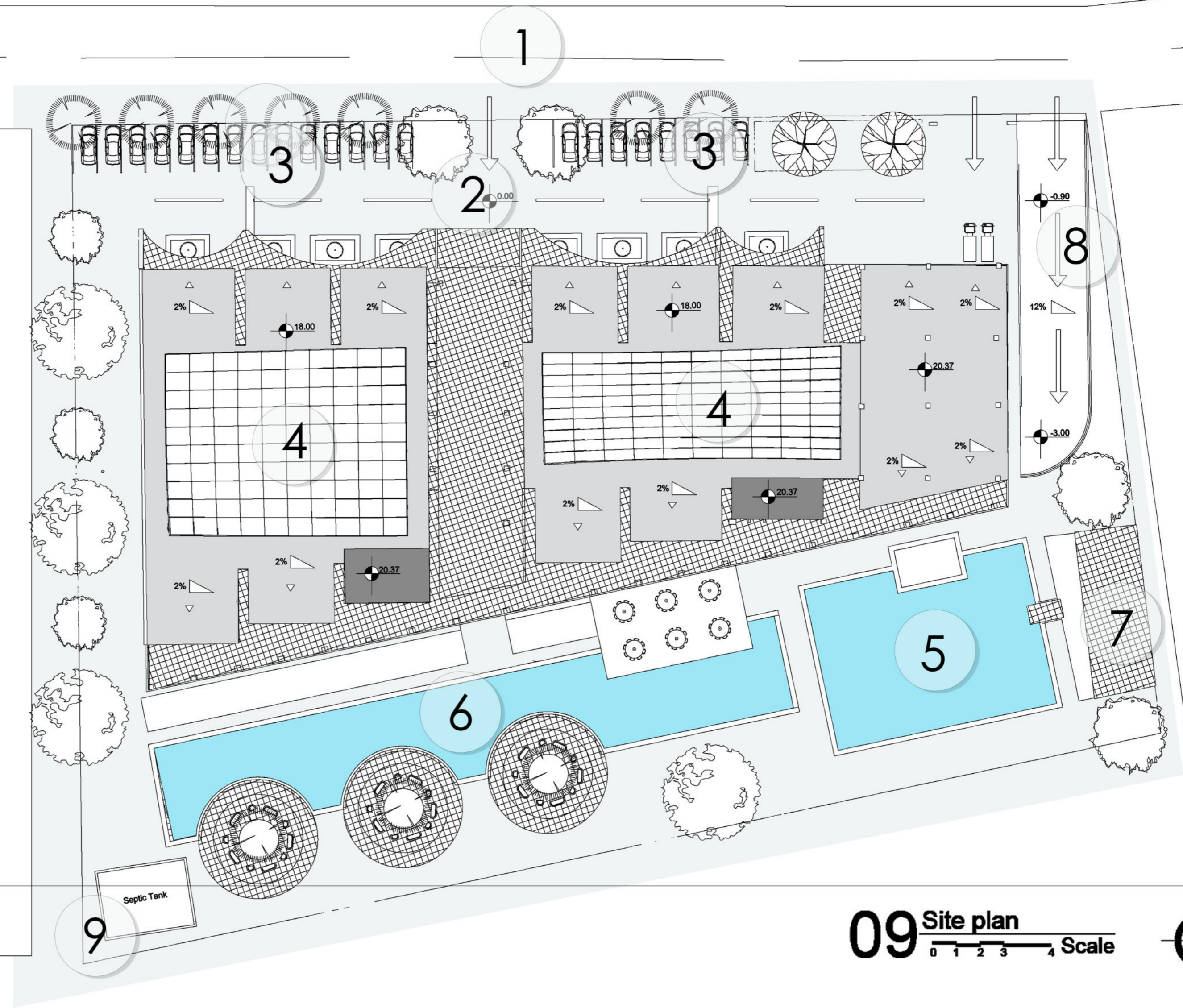
03 Ground Floor plan
0 1 2 3 4 Scale



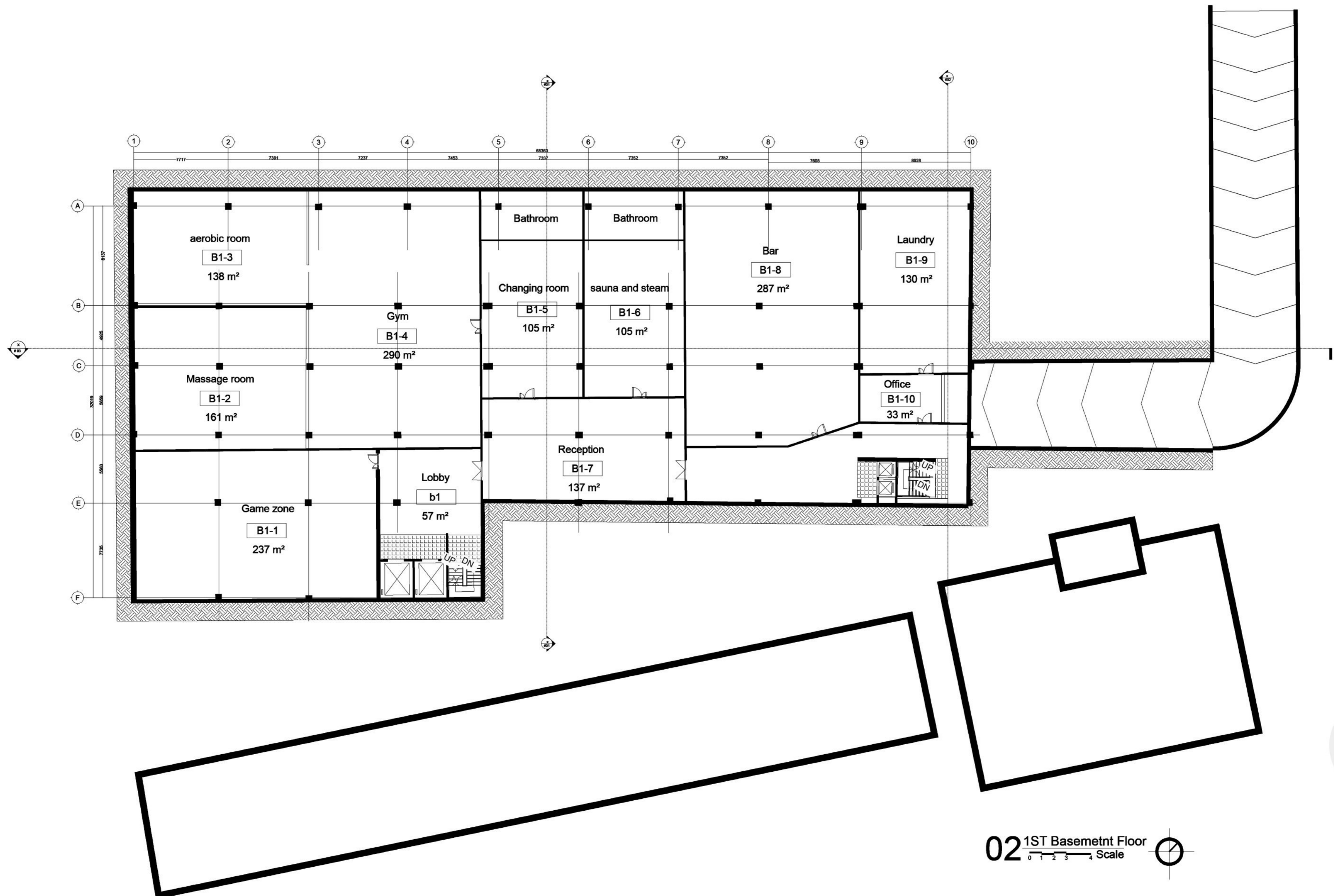
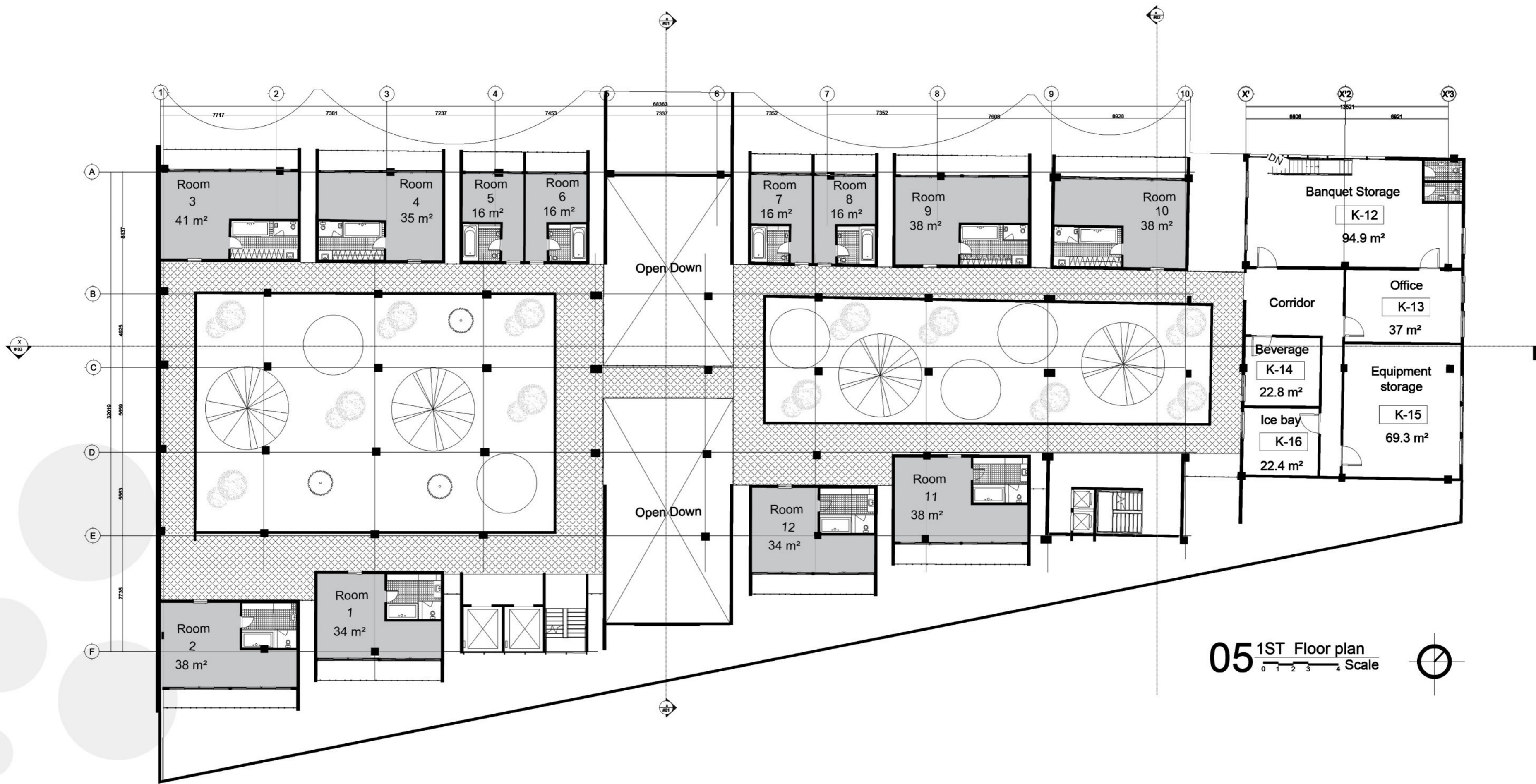
FLOOR PLANS

LEGEND

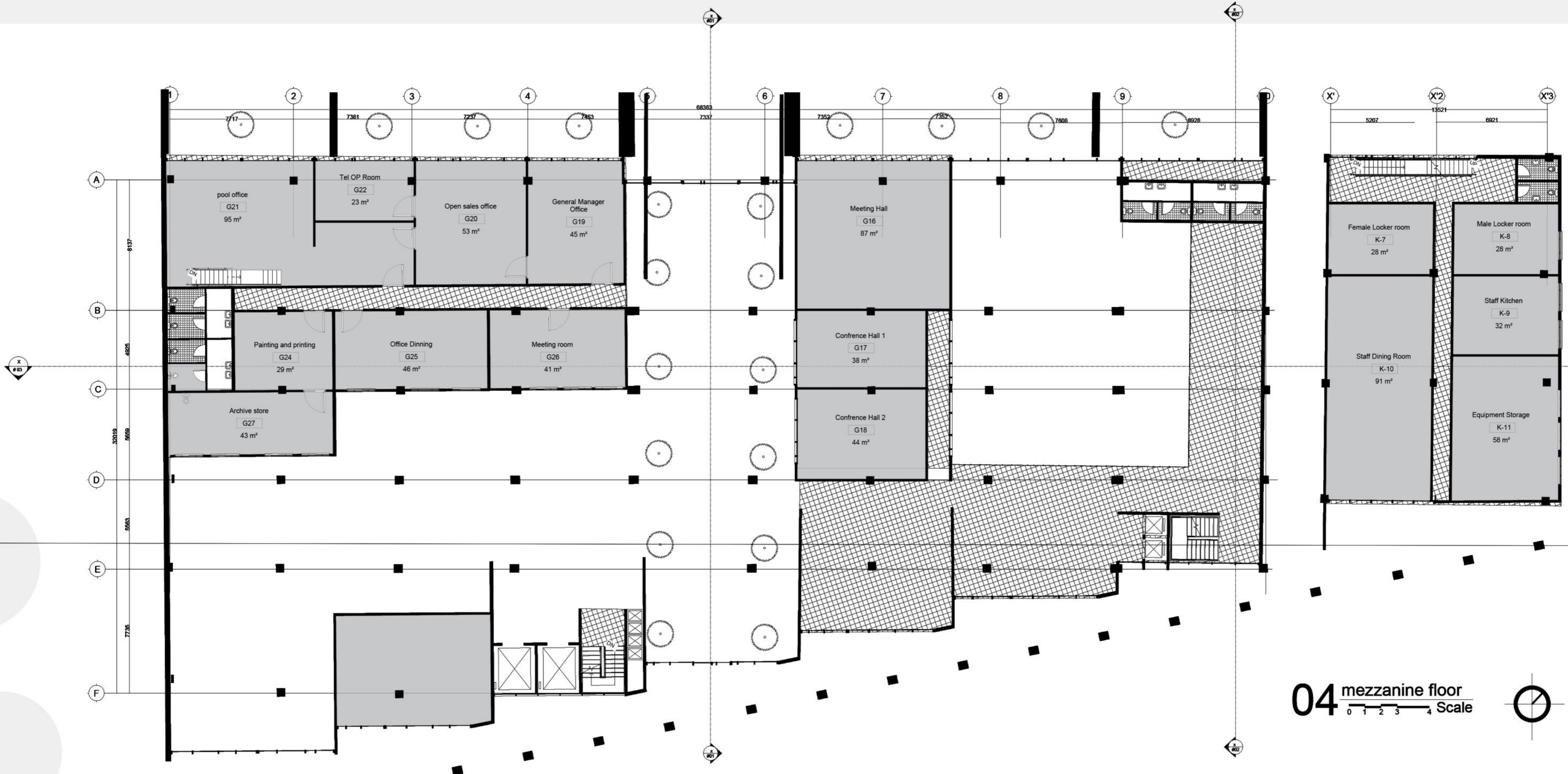
- 1 access road
- 2 Main entrance
- 3 Parking
- 4 Building domain
- 5 Swimming pool
- 6 water body
- 7 Changing room
- 8 Basement access
- 9 Septic tank



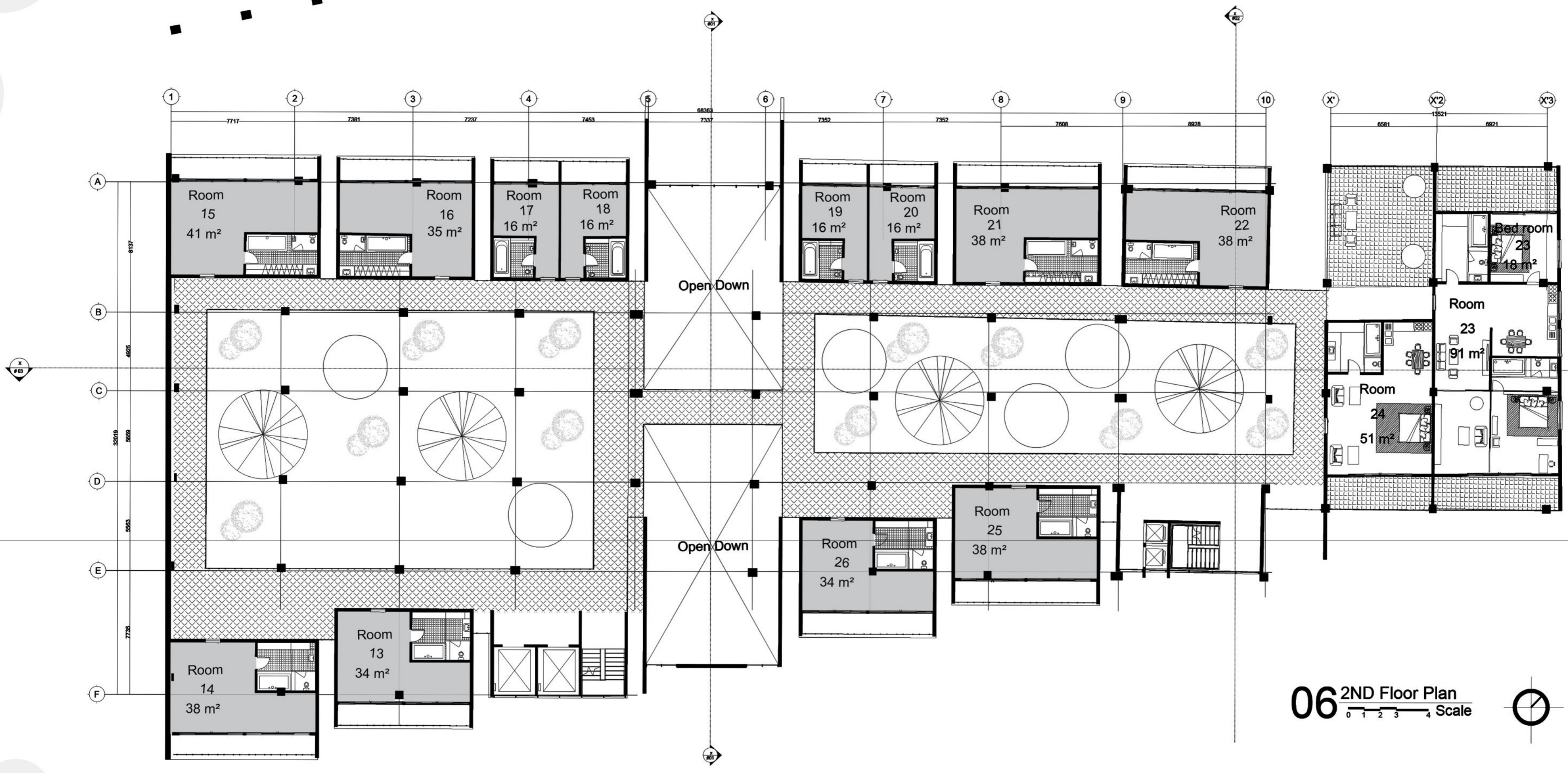
FLOOR PLANS



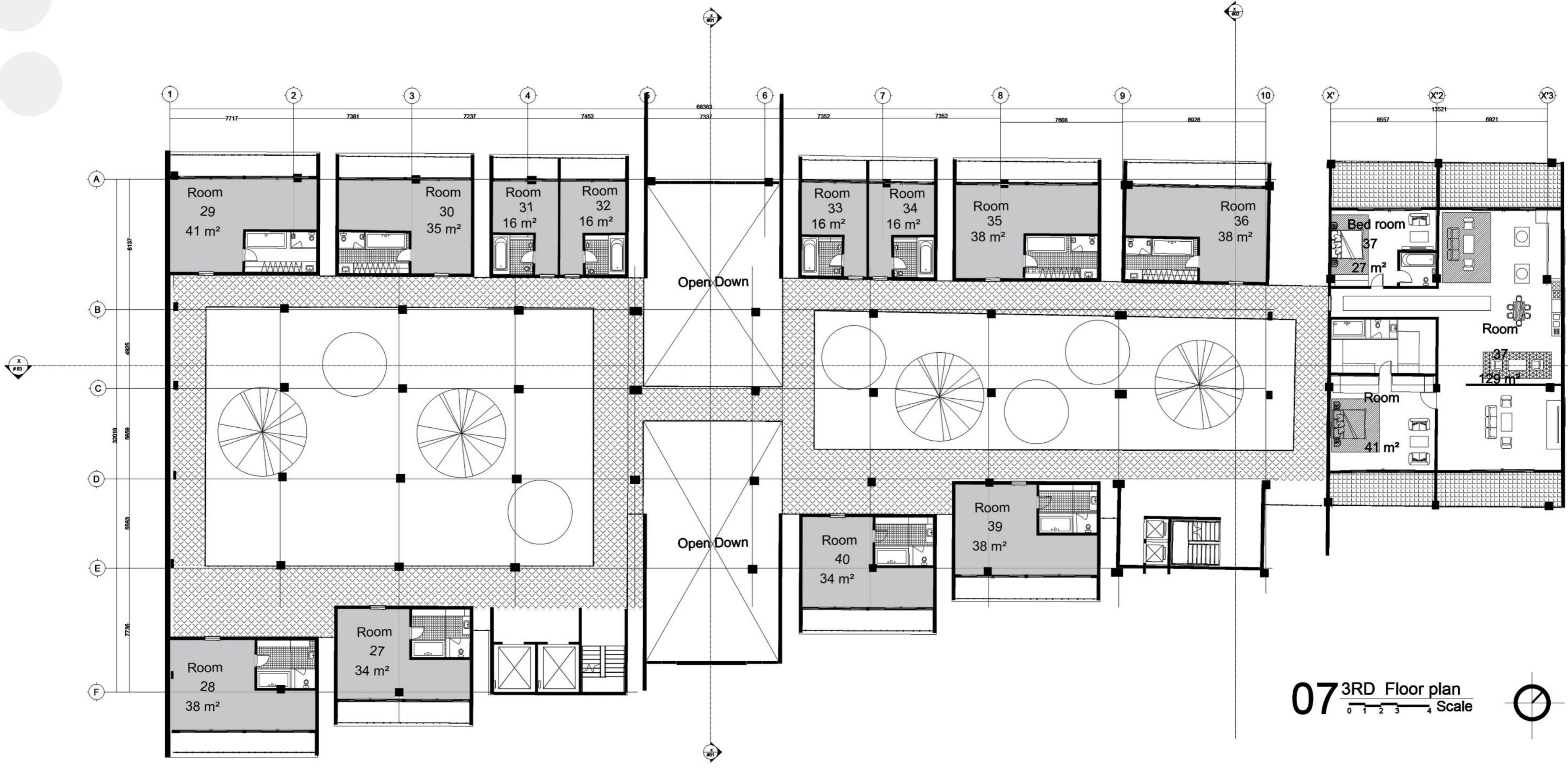
FLOOR PLANS



04 mezzanine floor
Scale

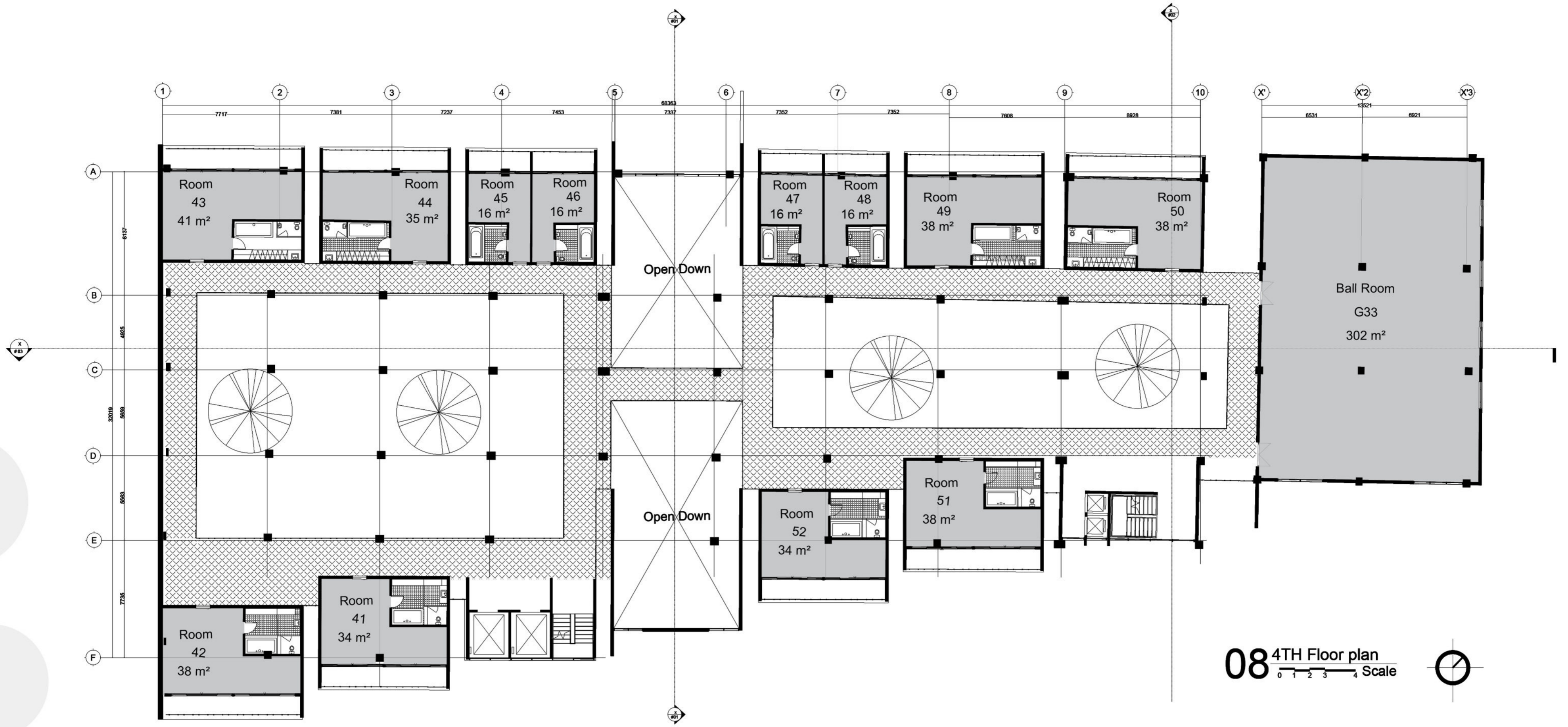


06 2ND Floor Plan
Scale

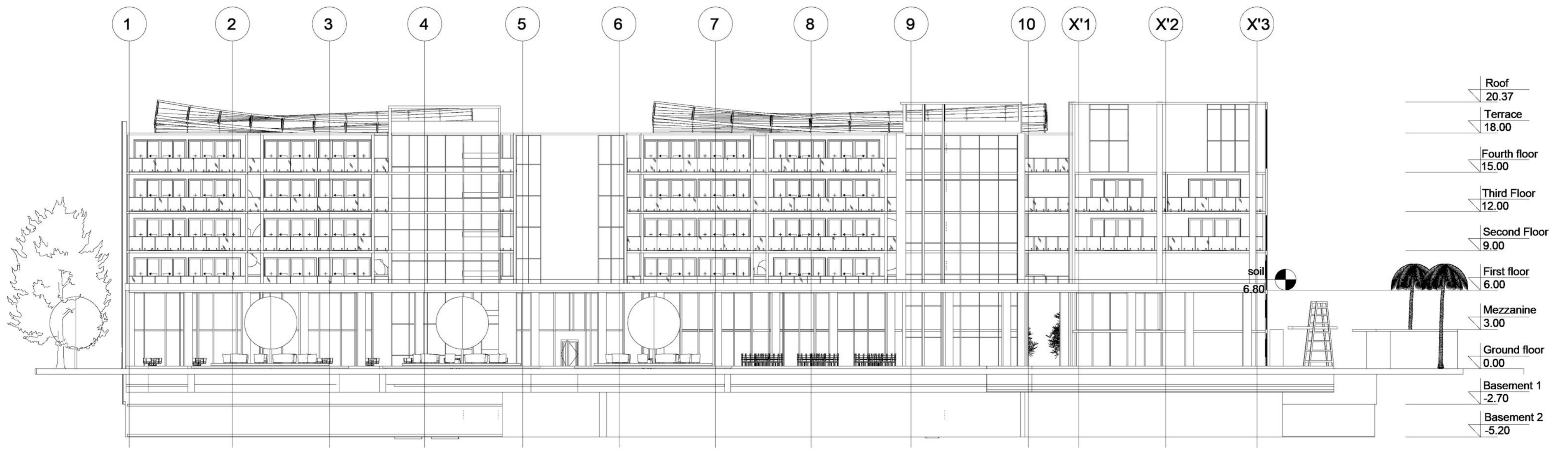


07 3RD Floor plan
Scale

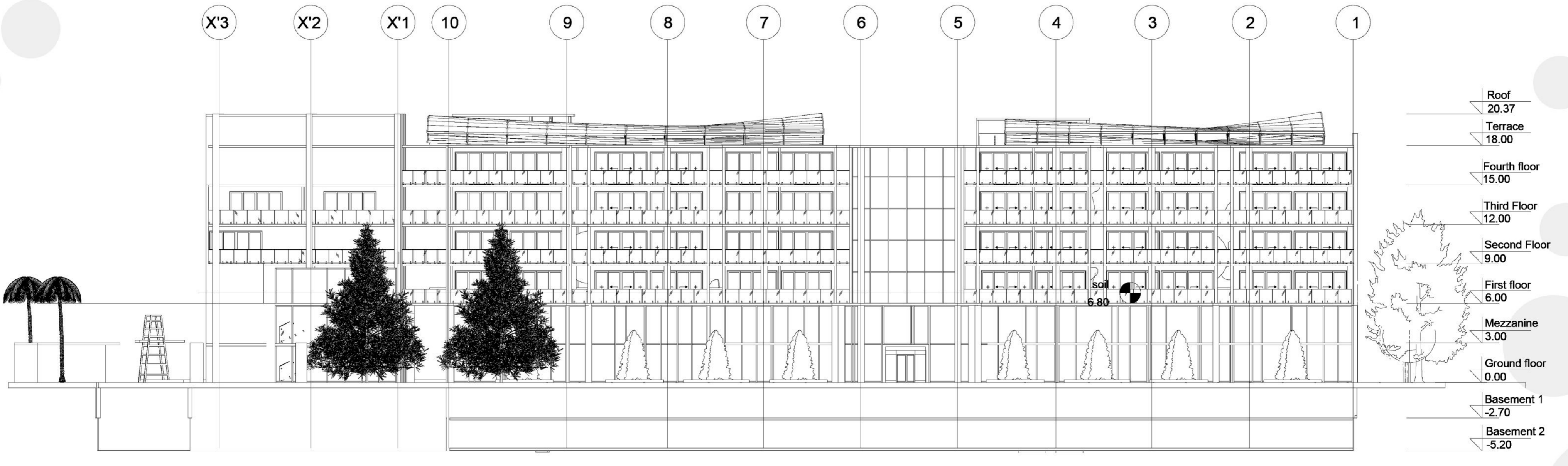
FLOOR PLANS



08 4TH Floor plan
0 1 2 3 Scale



11 South Elevation
0 1 2 3 Scale



10 North Elevation
0 1 2 3 Scale

ELEVATION AND SECTION

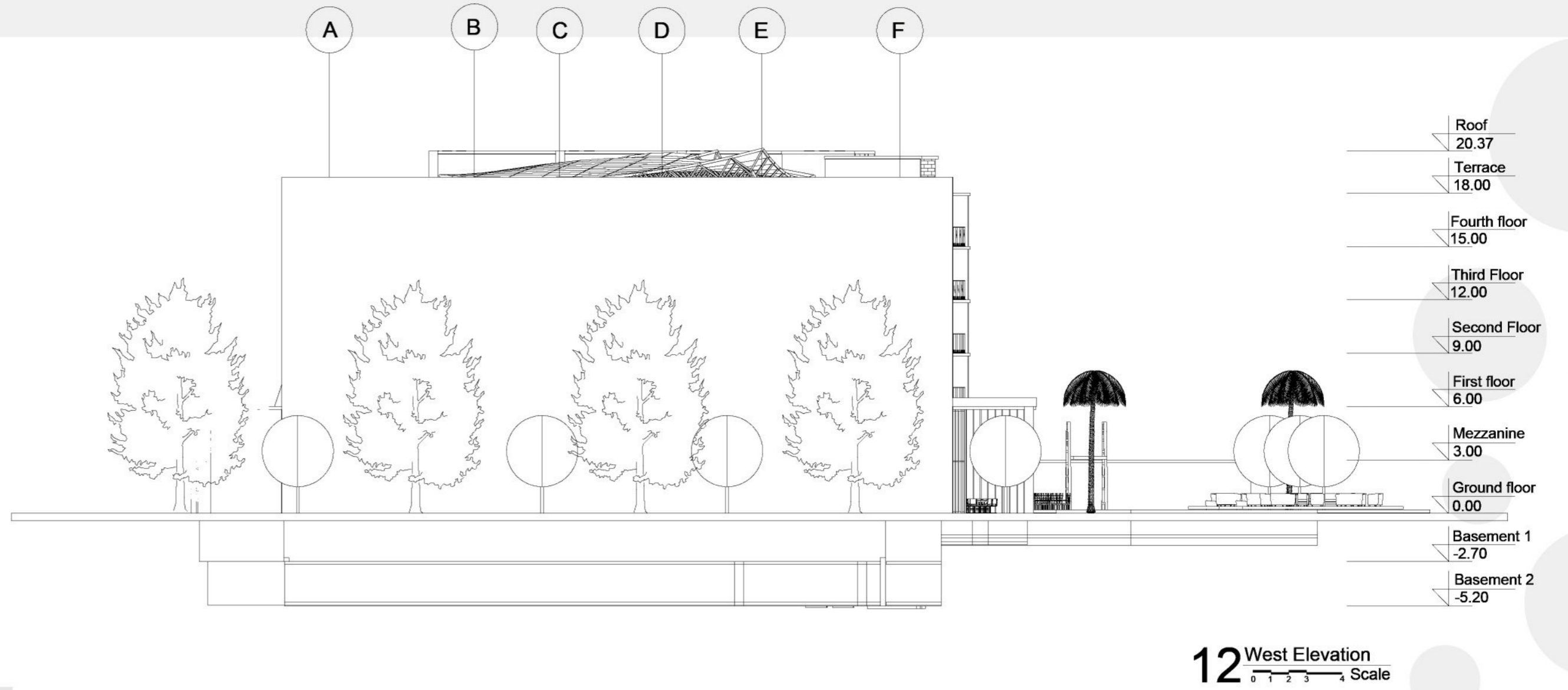


ATRIAL SYSTEM

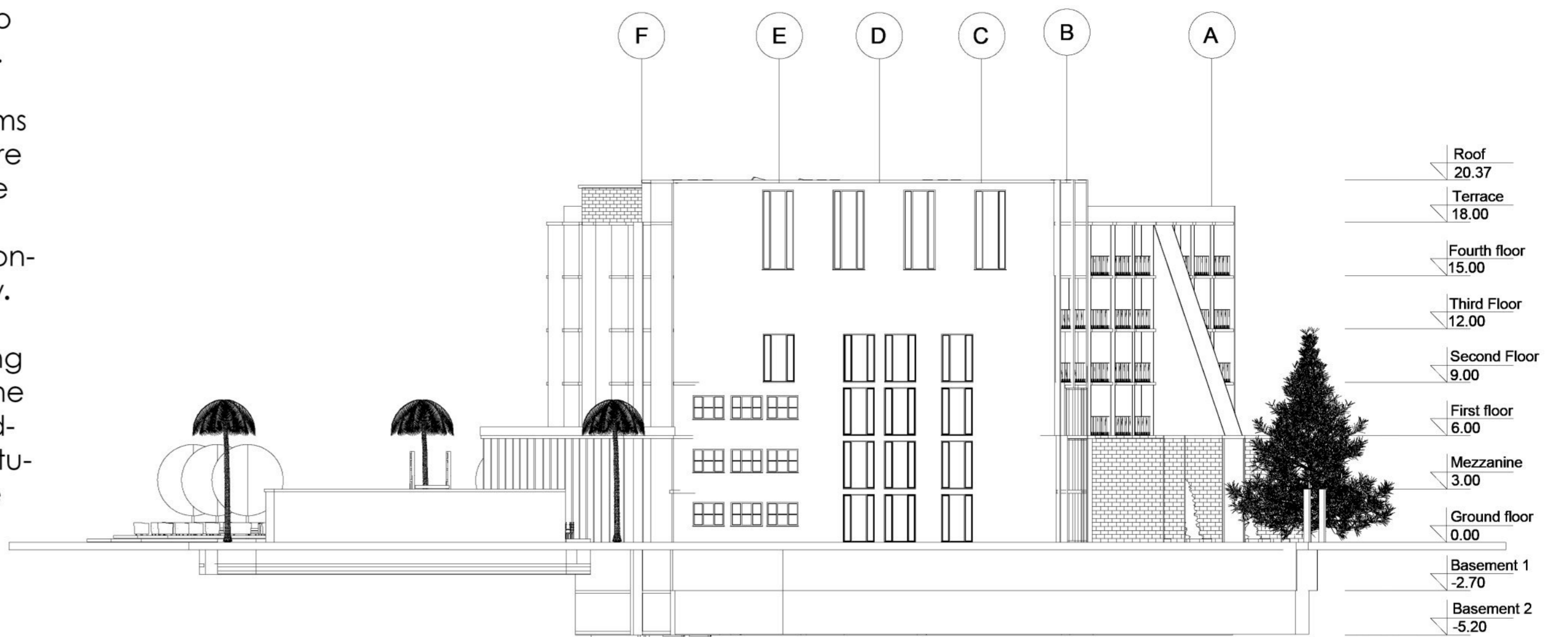
Atrium buildings appeal to people not only logically, but also emotionally by providing a connection to the outside inside. By bringing natural light into the interior, atriums offer larger, more efficient floor areas than conventional buildings. Atriums provide more desirable work environments by providing more space with a connection to natural daylight and the outside environment. Many believe that access to natural full-spectrum lighting creates a more healthful and productive environment. There have been several studies that support this view.

An atrium is a pleasant all-weather gathering place providing shelter from the more extreme climate conditions outside. The atrium replicates a desirable outdoor environment by providing the benevolent aspects of the outdoor environment; natural light, moderate temperatures while sheltering us from the harsher elements of extreme temperatures, rain, and winds.

KAREEM S. GALAL, MARCH, 2018



12 West Elevation Scale



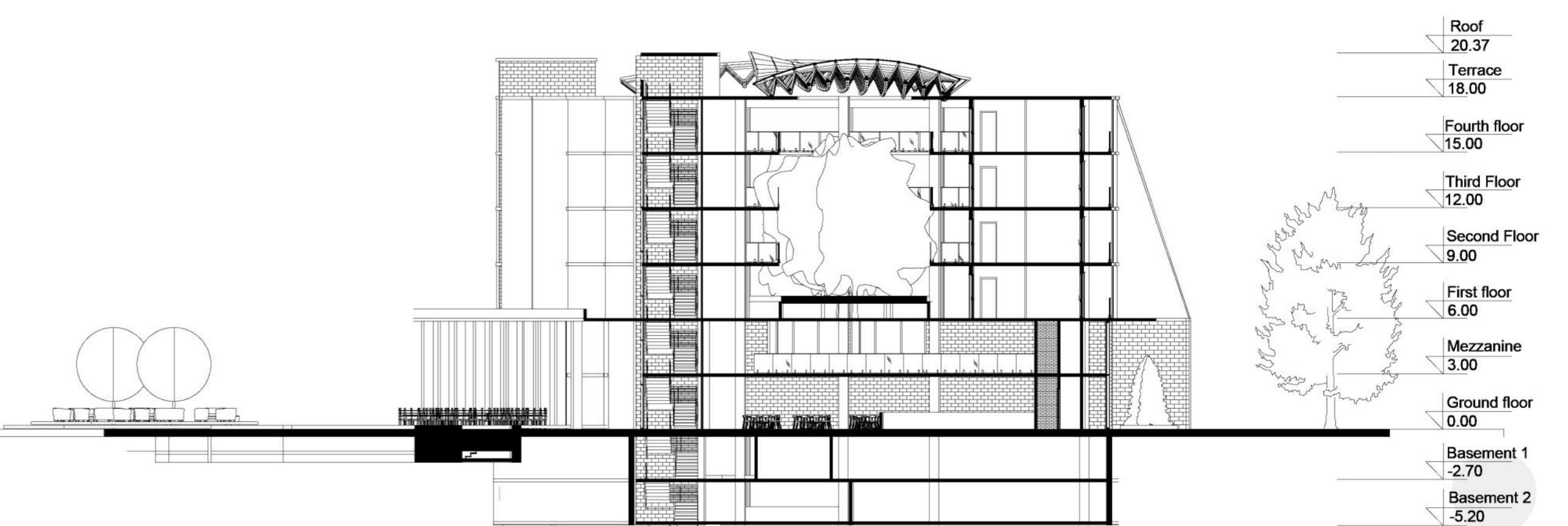
13 East Elevation Scale



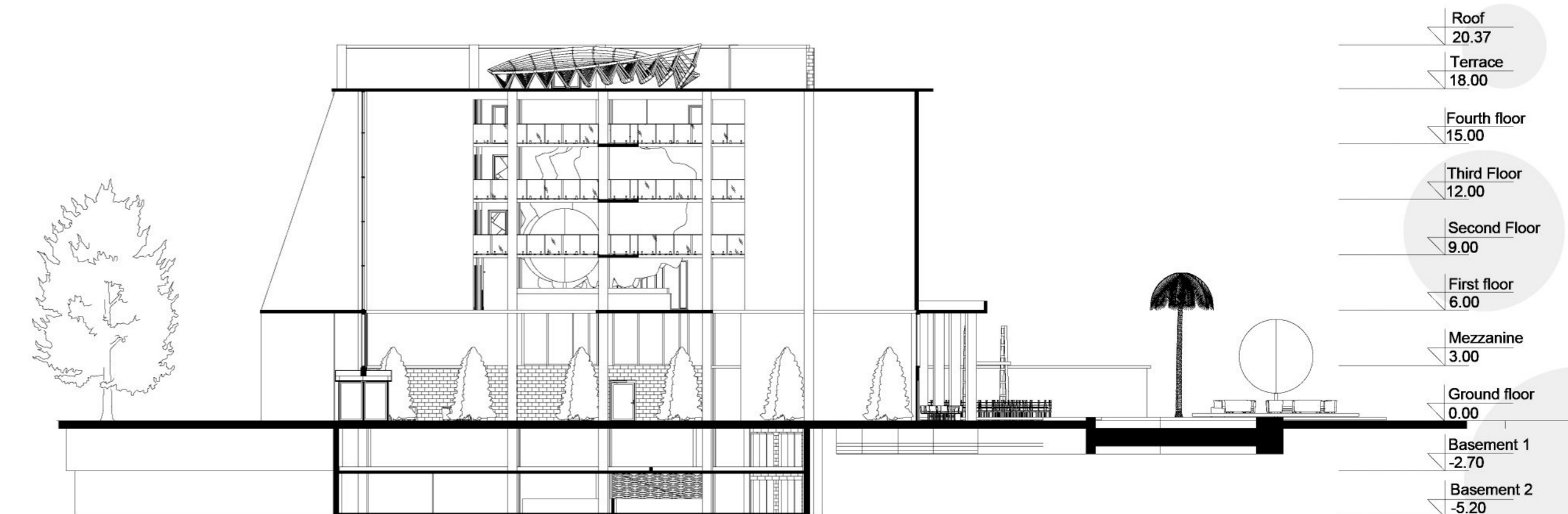
NATURAL LIGHT

According to the study on productivity gain from day light, productivity gains in the new building increased by 16%, with the personal controls alone accounting for a 3% gain. Atrium type is the main factor that determines the potential environmental advantages of atria in a building (Moosavi et al., 2014). Each form of the atrium has a particular environmental advantage, according to the expected heat gain, ventilation, and daylight performance. The heat-gain and daylighting factors work in addition to the climate zone and its parameters with the glazing surface area of the atrium type; we can notice that the greater the glassing area is, the greater the amount of heat gain and daylight will be. According to the atrium type, the centralized atrium has one glazing face on the top, while the attached, corner, and linear types have three glazing faces, varying in their areas, and the semi-enclosed type has two glazing faces.

MOOSAVI ET AL., 2014

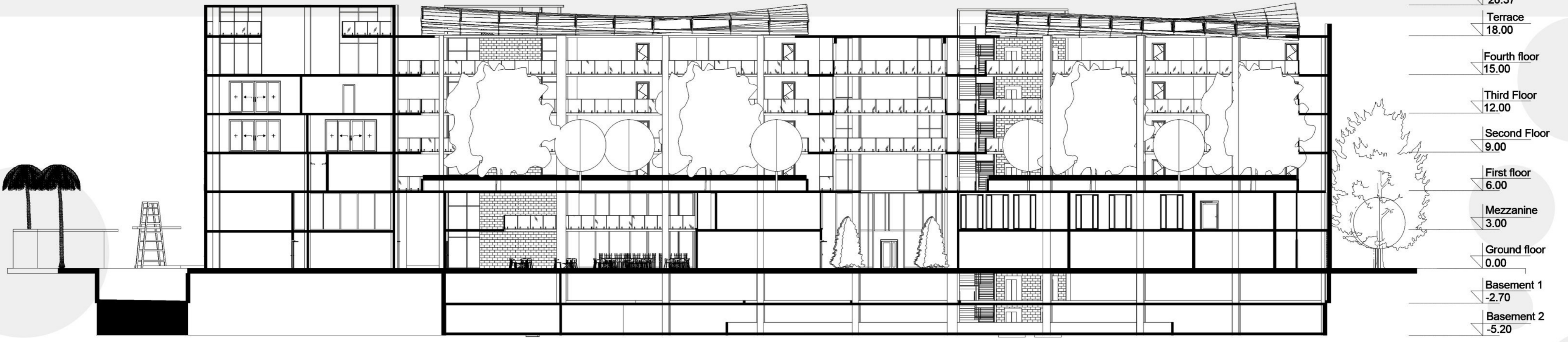


15 Section X-01 Scale



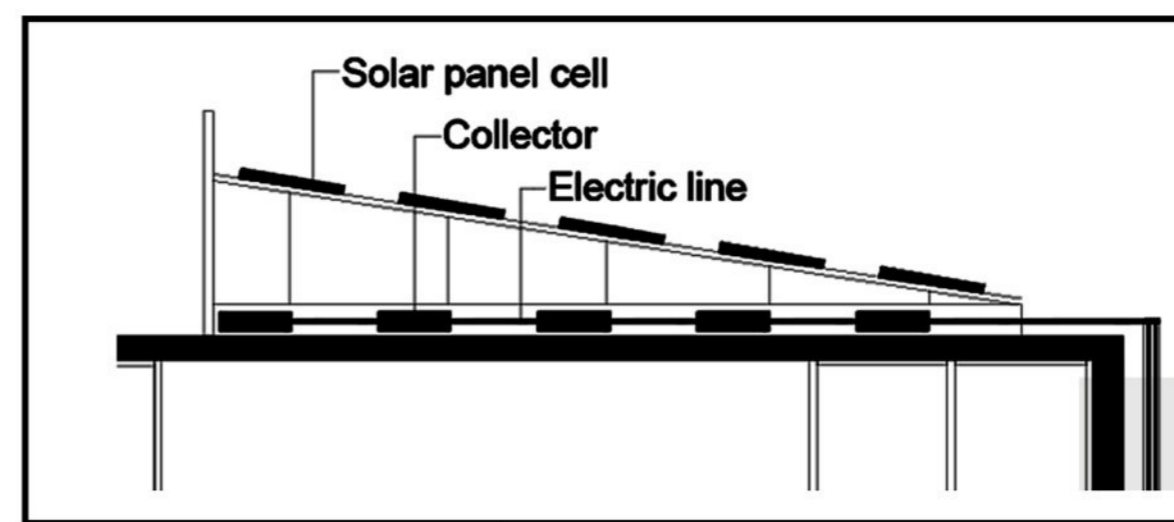
14 Section X-01 Scale

SECTION



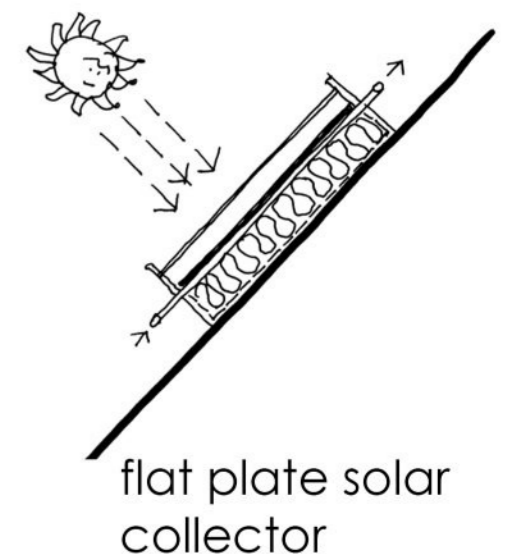
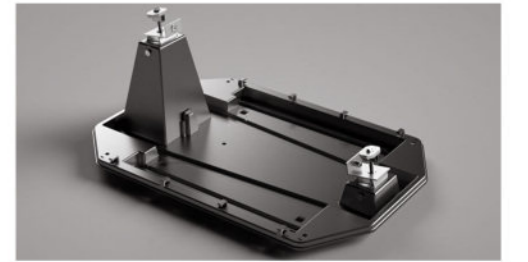
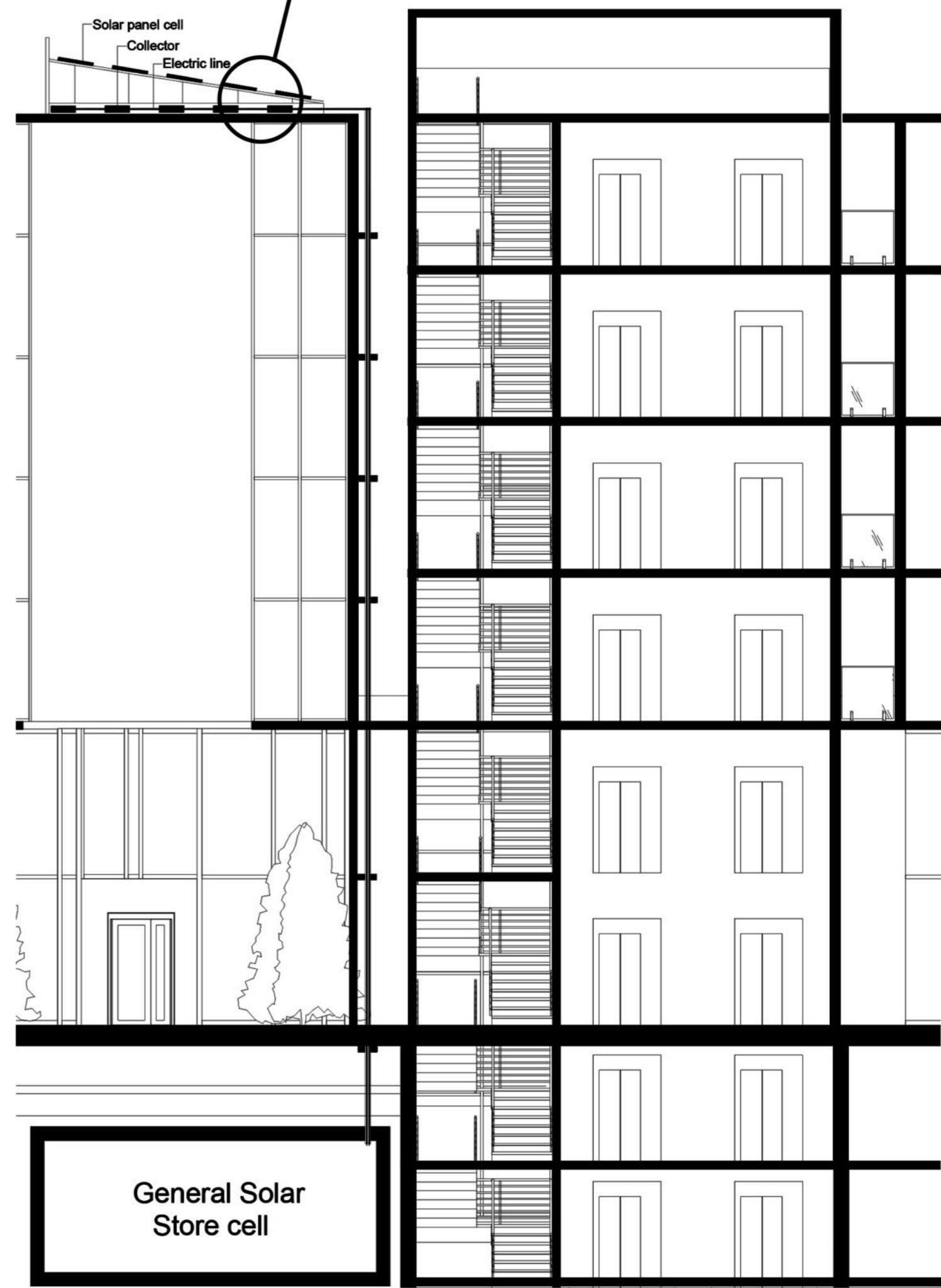
ENERGY-EFFICIENT GLASS WINDOWS

As the name suggests, energy-efficient or energy-saving windows are specially designed to prevent hot or cold air from escaping your home or office. These structures, through increased insulation, reduce your energy usage and, thus, bring down the stress exerted on your heating and cooling devices along with their running costs. Since energy-efficient glass windows are capable of maintaining optimal interior temperatures, they award any space high thermal comfort. Energy efficiency is a critical part of sustainable design. Modern architecture uses a lot of glass to create magnificent, awe-inspiring structures ushering in a tone of natural light. Ordinary glass can transmit 80% of outdoor heat inside. For commercial setups that have façades made from countless glass panes, this can be a disadvantage as it puts a lot of stress on cooling and heating devices. Not only does it seriously hike the energy bills but also makes your interiors rather uncomfortable, thwarting productivity. Therefore, specially designed energy-efficient glass is available in the market, manufactured specifically to achieve sustainable running costs for commercial infrastructure.



16 Section X-X Scale

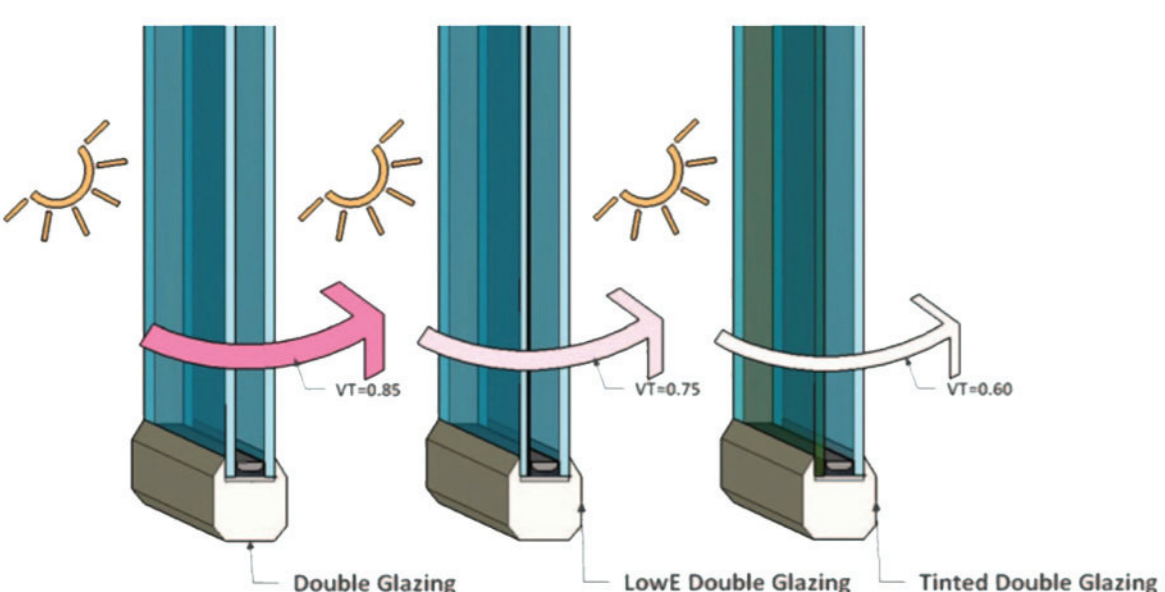
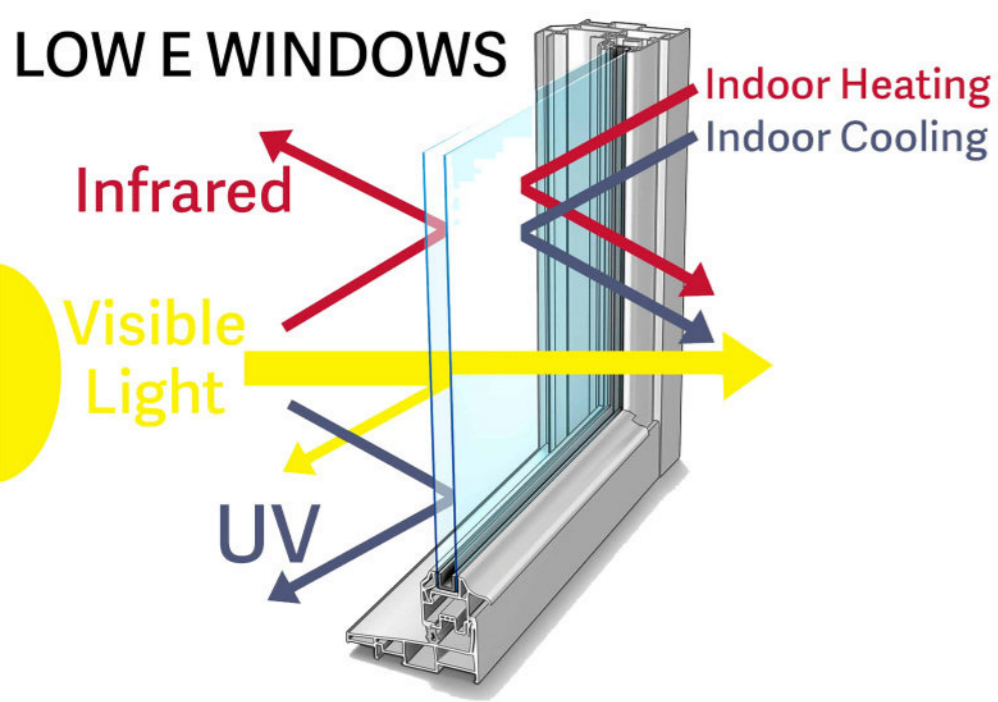
SOLAR ENERGY



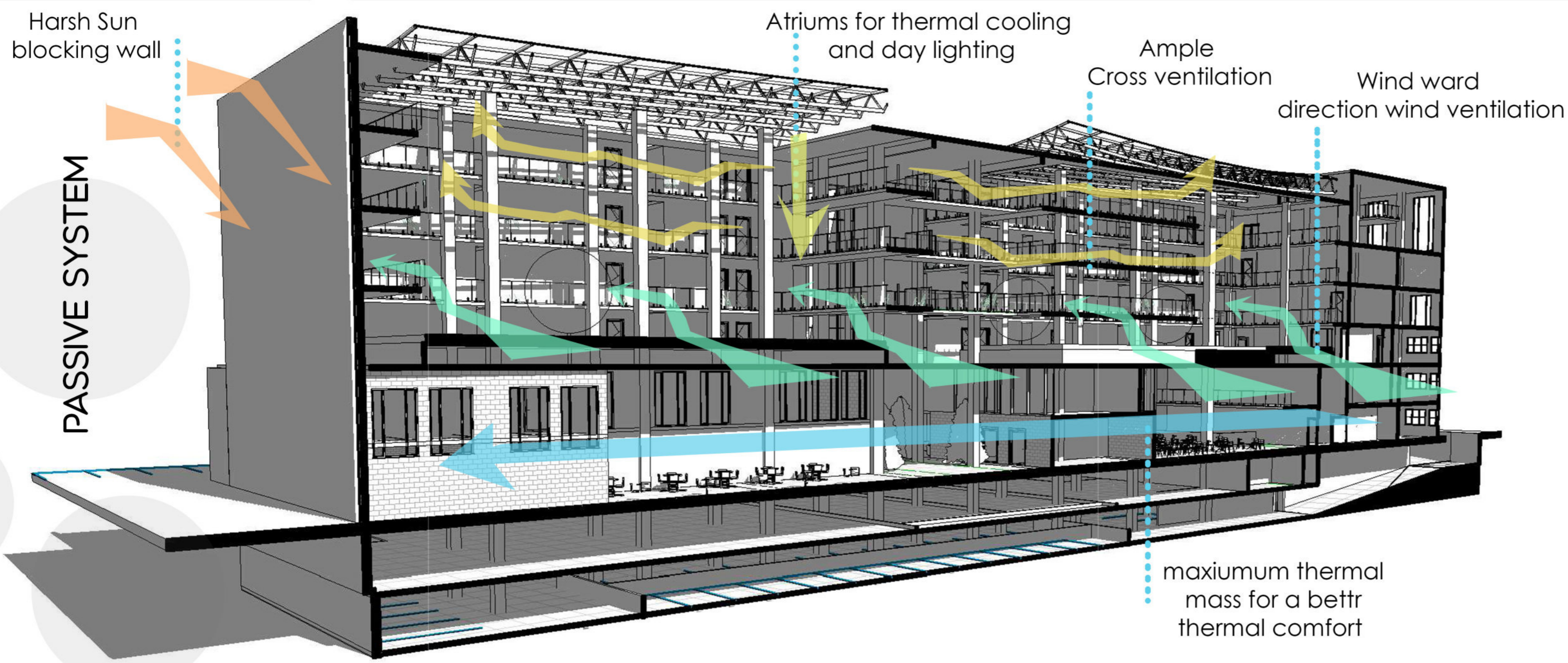
flat plate solar collector

19 Solar panel diagram Scale

DOUBLE GLAZING LOW EMISSIVITY GLASS



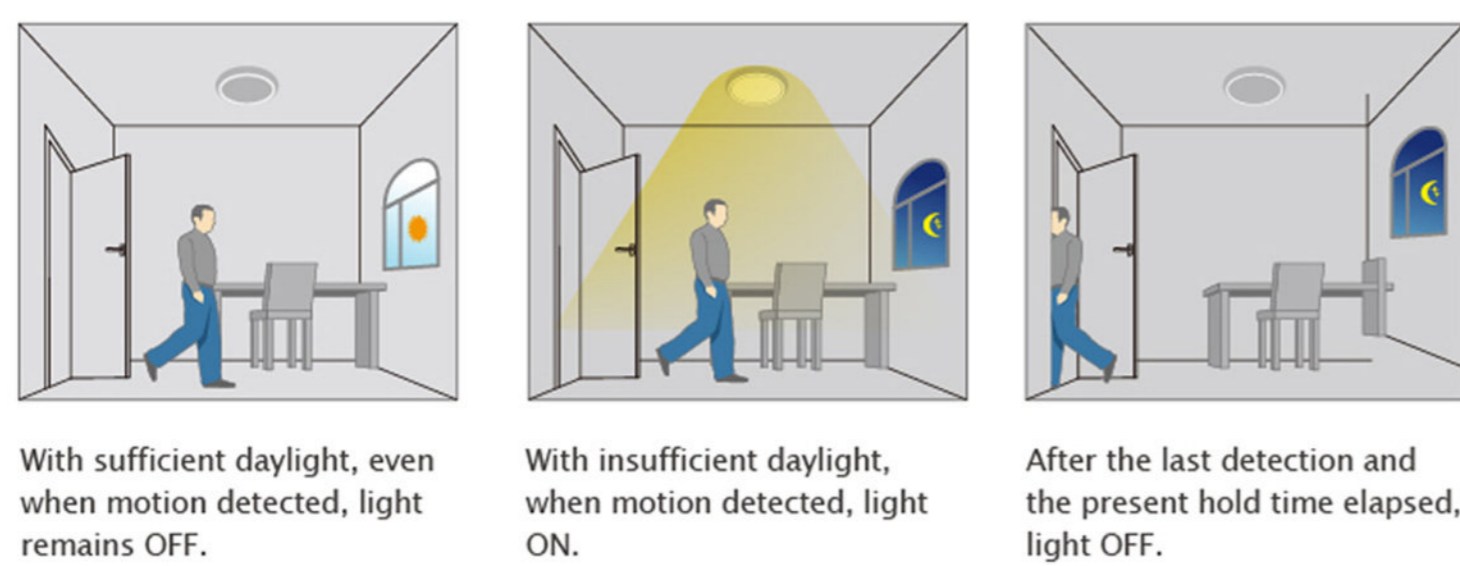
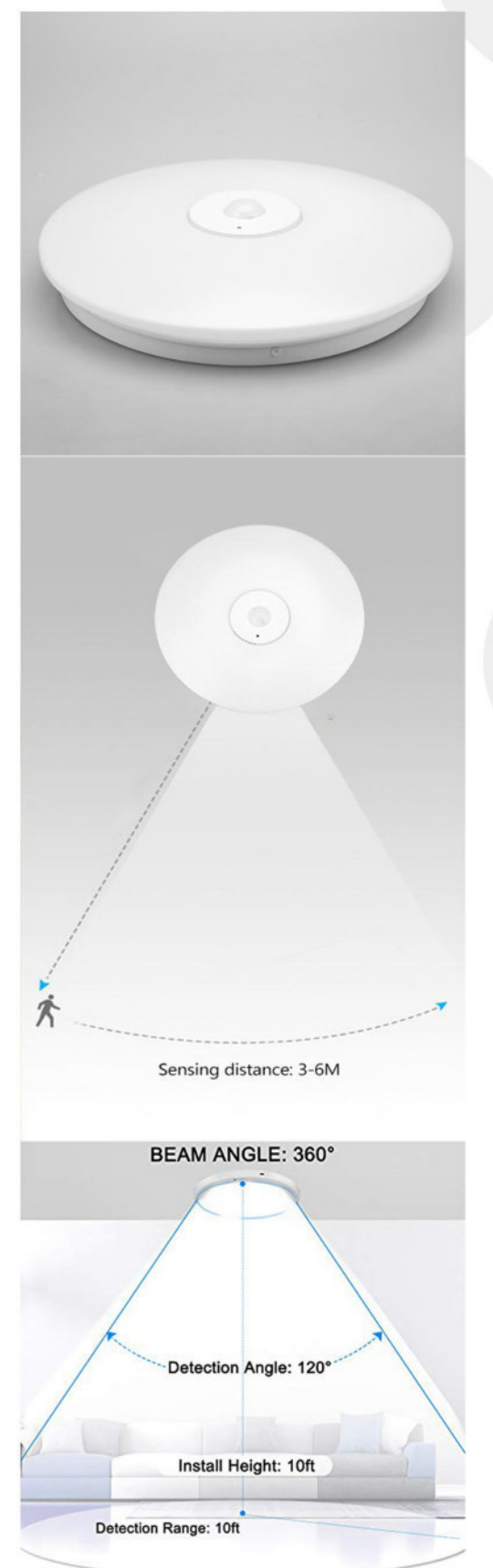
ENERGY ANALYSIS



ELECTRICAL OUTLETS

Day light and motion presence detector Led lights

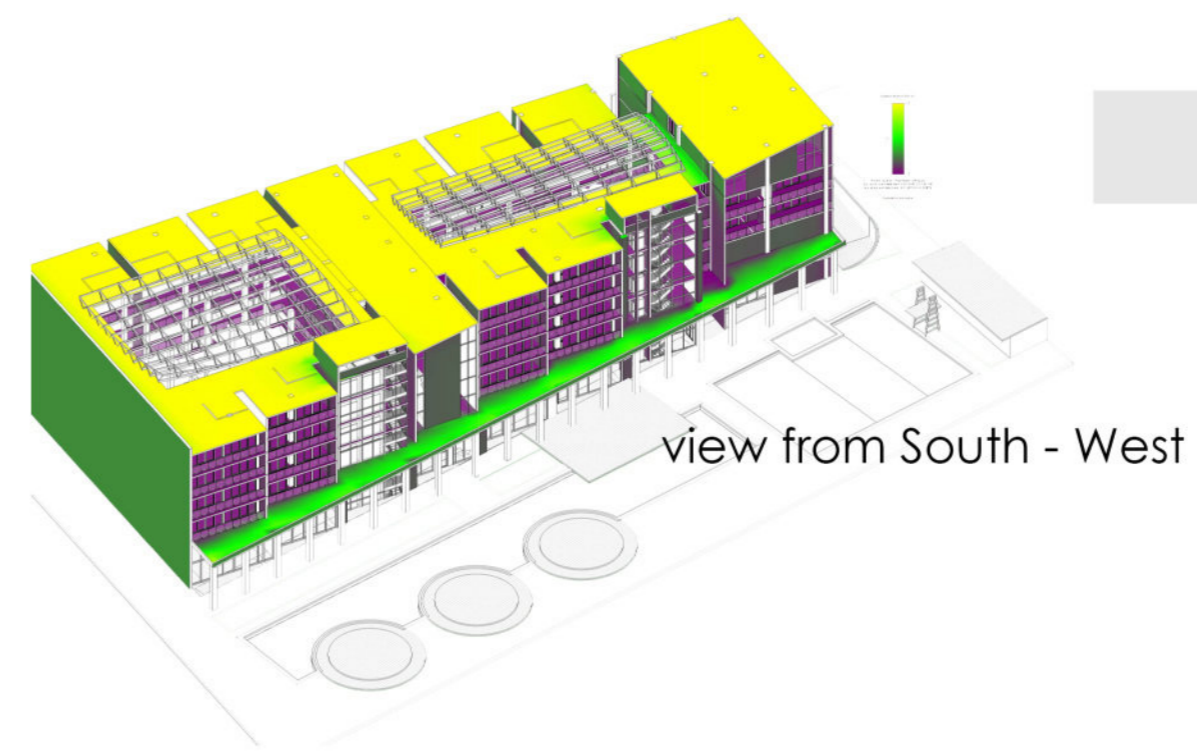
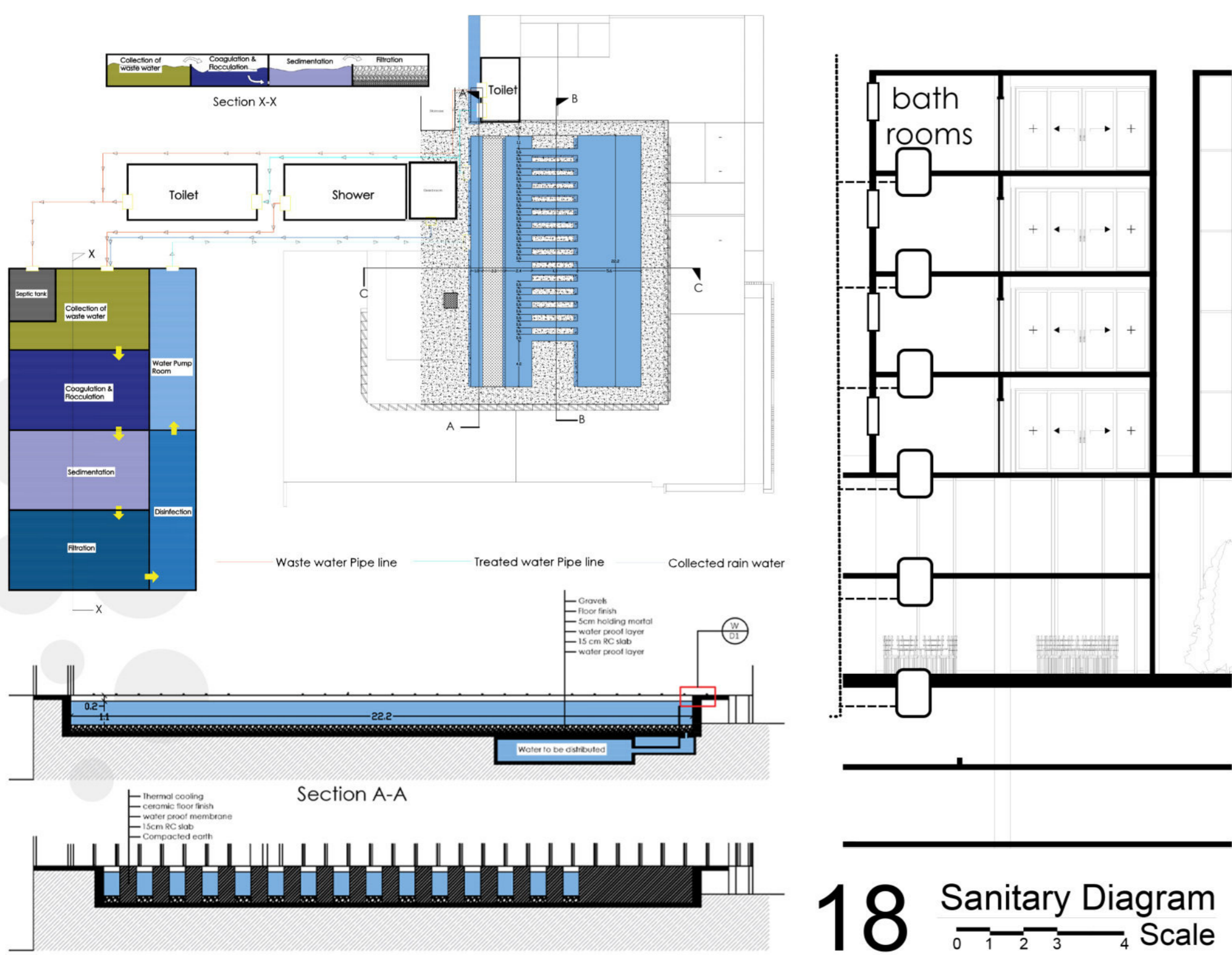
Sensing distance from 3m - 6m



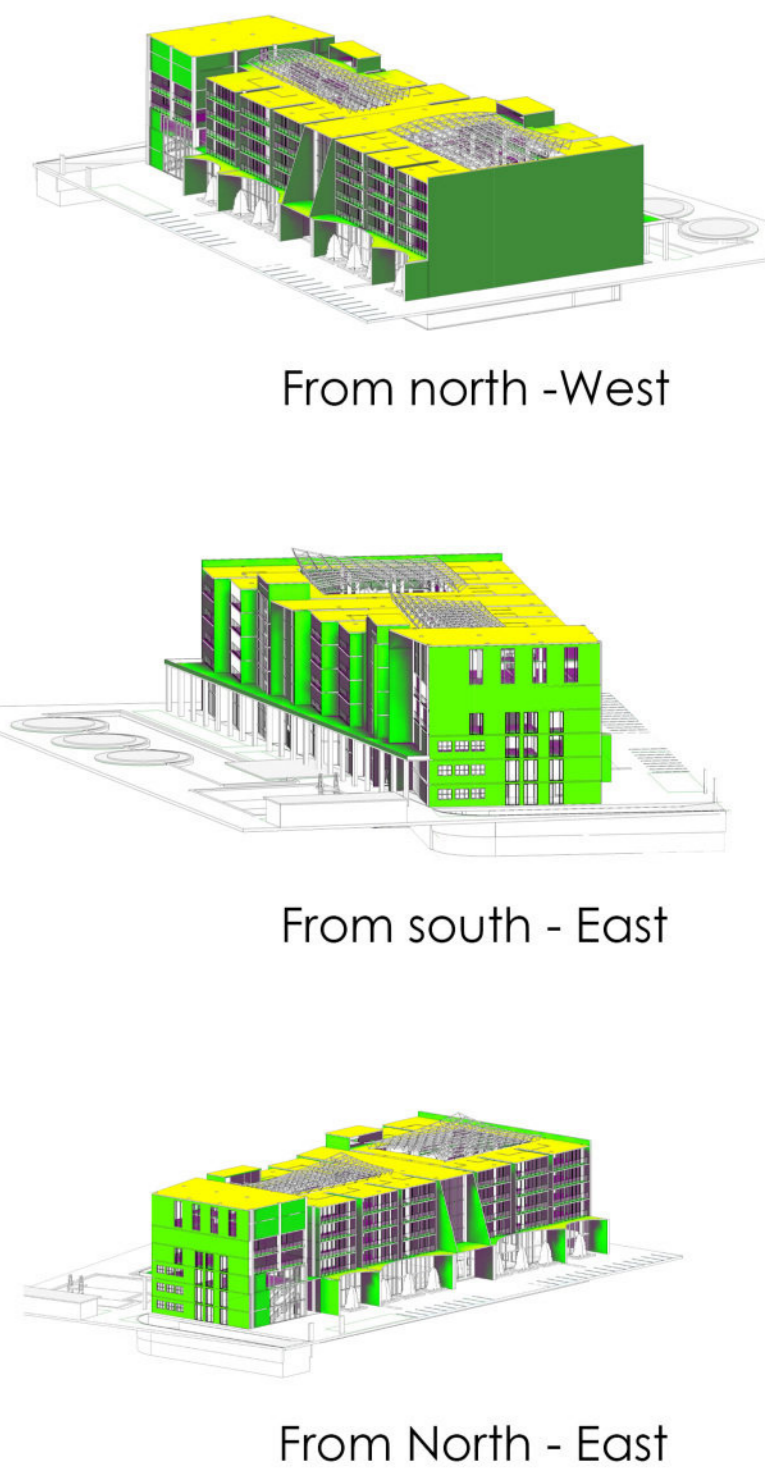
LED LIGHT PERFORMANCE

Energy efficient lighting is a combination, where you look for the lowest possible energy consumption (W/m² and/or W/ m²/100 lx) in such a way that the quality requirements for lighting will be met. Light source efficacy (lm/W) - the higher the efficacy, the more energy-efficient the light source is.

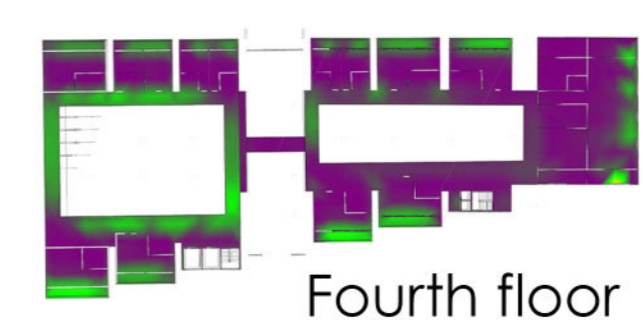
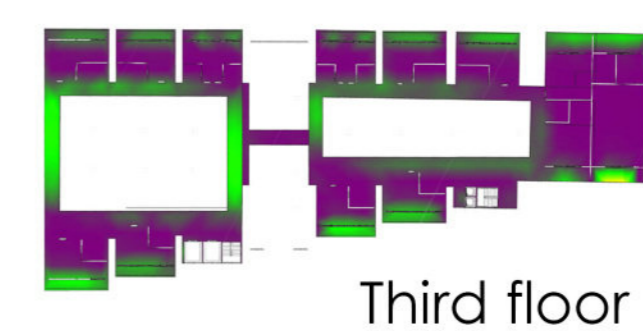
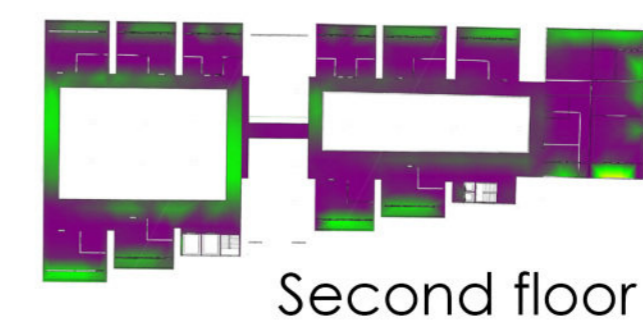
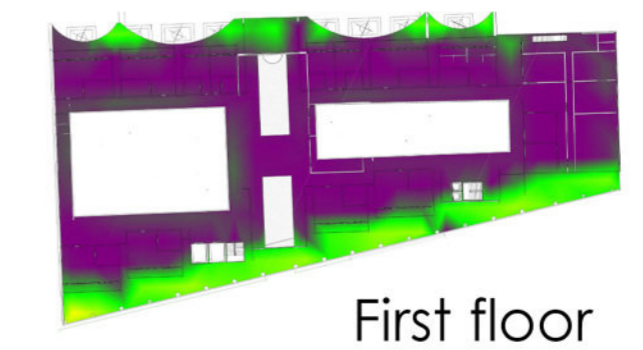
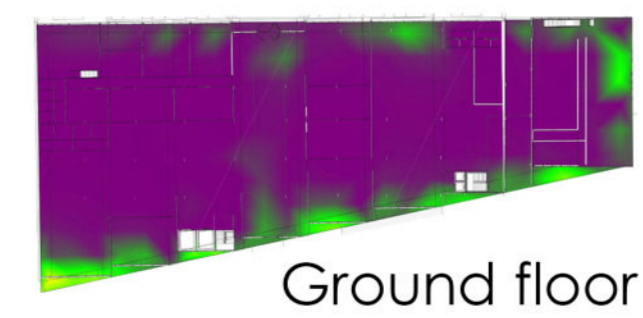
SANITARY AND WATER TREATMENT SYSTEM



SOLAR ANALYSIS



NET ZERO ENERGY BUILDING



ENERGY AUDIT: ELECTRIC AND WATER COMPUTATION

	Guest rooms					Other High	Other low
	King bed	Queen bed	Single bed	P.Suit	One suit	Kitchen	office
Energy used	32	34	25	45	35	300	45
Number	20	10	16	1	1	2	10
Total	640	340	400	45	35	600	450

Material	Concrete	LE glass	wood	Metal
Functions	Structural mass	Envelop	Door	Door & roof structure
Energy efficiency value by %	70%	20%	3%	1%
Thermal balance	high	medium	high	medium

No	Type	No. Elements	Element power consumption	Operating time per day	Energy consumption per day/(kwh)
1	lamp	8	11	18	1.584
2	Tv	1	100	12	1.200
3	Refrigerator	1	65	24	1.560
4	Boiler	1	1000	1	1.000
5	Water heater	1	1,440	18	25.920
Total					31.264

Solar panel	single	Meter square
Per cell	9.4 kw/month	1m ²
Per cell	0.3 kw/day	1m ²
Per cell	To meet the demand	8,366m ²

Input Water	Per day	Per month	Annually
Per room	50 litter	1500	18,000
total	2600	78,000	936,000

